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(54) **Waste liquid treating device and liquid ejecting apparatus incorporating the same**

Behandlungsvorrichtung für Abfallflüssigkeit und ein Flüssigkeitsausstossgerät welches eine solche beinhaltet

Dispositif de traitement de liquide de déchets et appareil d'éjection de liquide le comportant

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(56) References cited:
EP-A- 0 995 603 EP-A- 1 147 901
US-A1- 2002 033 860

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a liquid ejecting apparatus such as an ink jet recording apparatus which can execute so-called marginless printing by disposing ink away from the end of a recording medium. Other than recording apparatuses such as printers, copiers, facsimile machines, the liquid ejecting apparatus includes an apparatus for ejecting liquid, in place of ink, from a liquid ejecting head onto an object on which the ejected liquid is landed.

[0002] Examples of the liquid ejecting head include a colorant ejecting head to be used for manufacturing a color filter such as a liquid crystal display, an electrode material (conductive paste) ejecting head to be used in the formation of an electrode such as an organic EL display or a surface emitting display (FED), a biological organic matter ejecting head to be used for manufacturing a biochip and a sample ejecting head to be a precision pipette in addition to the recording head.

[0003] An ink jet recording apparatus (hereinafter referred to as a "printer") has an ink jet recording head (hereinafter referred to as a "recording head") for discharging an ink, and a platen provided opposite to the recording head and supporting a sheet from below to define a distance between the recording head and a printing surface. Furthermore, some printers can execute so-called marginless printing to print a sheet without a margin (for example, see Japanese Patent Publication No. 2002-86821 A).

[0004] In the printer capable of executing the marginless printing, a groove hole is formed on the upper surface of the platen (a platen surface). The groove hole includes a groove hole formed to be extended in a primary scanning direction over the platen surface and a groove hole provided to be localized in a portion positioned on the end of a sheet. For example, when the leading end of the sheet is positioned above the groove hole formed to be extended in the primary scanning direction, ink is also ejected to a region provided out of the leading end so that the marginless printing is carried out at the leading end. In other words, the ink is disposed into the groove hole.

[0005] In general, an ink absorber (hereinafter referred to as a "first waste liquid absorber") for absorbing ink is provided in the groove hole. If such a first waste liquid absorber is not provided, there is a possibility that the ink disposed into the groove hole might become an ink mist to deteriorate printing quality or might stick to the driving components of a printer to disturb a normal printing operation.

[0006] A plurality of through holes are provided in the bottom portion of the groove hole. The ink disposed into the groove hole is once absorbed into the first waste liquid absorber and is then dropped downward from the through hole. Accordingly, a waste liquid tray for receiving the ink

thus dropped is provided under the platen. An ink absorber (hereinafter referred to as a "second waste liquid absorber") for absorbing ink is provided in the waste liquid tray in the same manner as the groove hole. Consequently, the ink stored in the waste liquid tray is reliably held so as not to leak to the outside.

[0007] The ink disposed into the groove hole is absorbed by the first waste liquid absorber. The ink thus absorbed is not entirely dropped into the waste liquid tray. More specifically, a part of the ink is dropped from the through hole toward the waste liquid tray and the other part is maintained in the lower part of the first waste liquid absorber according to the ink holding property of the first waste liquid absorber.

[0008] If the printer is greatly inclined in the handling or transportation of a user in such a state, for example, the ink held in the lower part of the first waste liquid absorber concentrates on the end of a platen and might overflow out of the groove hole in the worst case. When such a phenomenon arises, there is a possibility that the components of the printer (for example, a driving system or an electric system) might be adversely influenced, and furthermore, the ink might leak out of the printer.

[0009] In the method described above, furthermore, the ink is not dropped until the amount of the absorption of the ink in the first waste liquid absorber approaches a saturation. Accordingly, there is a possibility that the ink might be maintained in a large amount in the first waste liquid absorber for a long period of time. As a result, in the case in which an ink jet recording apparatus is used with an inclination due to transportation between users, the ink stored in the first waste liquid absorber flows out of the apparatus in some cases. In the case in which an ink which is easily solidified, for example, a pigment based ink is used, particularly, there is a possibility that the ink might be held in the first waste liquid absorber for a long period of time and the ink solidified on the surface of the first waste liquid absorber might be thus deposited to deteriorate the absorbing capability of the first waste liquid absorber.

[0010] As another configuration of the ink jet recording apparatus, therefore, a first waste liquid absorber and a second waste liquid absorber are formed integrally (for example, see Japanese Patent Publication No. 2001-301201A; page 7 and Fig. 7). Consequently, an ink absorbed in the first waste liquid absorber is only moved exactly in the direction of a gravity in the first waste liquid absorber and is then held by the second waste liquid absorber so that the movement of the ink from the first waste liquid absorber to the second waste liquid absorber can be carried out quickly. Thus, the ink can be prevented from overflowing from the first waste liquid absorber or being solidified.

[0011] However, a component having such a configuration that the first waste liquid absorber and the second waste liquid absorber are integrated has a novel configuration which has not been conventionally obtained. For this reason, there is an anxiety that the design of an ink

jet recording apparatus might be changed considerably when the such a component is employed. There is an anxiety that a cost might be increased due to the change in a design and a production efficiency might be reduced.

[0012] Further, EP 1 147 901 A2 discloses a recording medium guide member placed along the main scanning direction scanned by the carriage (4) mounted with a recording head, and ink-receiver holes for receiving ink discharged from their recorder head are formed on the guide member in positions beyond the edges of the recording medium being conveyed. Ink absorbing materials are placed in said ink-receiver holes, and a discharged ink accumulating means that cumulatively counts the amount of ink discharged into the ink absorbing materials is provided. The amount of ink discharged into the ink-receiver holes can be controlled by the discharged ink accumulation means so that contamination of the left and right edges or the top and bottom as well as left and right edges of the recording medium, caused by excessive ink collecting in the ink-receiver holes, can be avoided.

SUMMARY OF THE INVENTION

[0013] It is therefore an object of the invention to provide a liquid ejecting apparatus, in which waste liquid disposed to a waste liquid absorber provided in a groove hole can be smoothly lead to a waste liquid tray arranged in a lower portion of the apparatus, without involving cost increasing or remarkable design change.

[0014] In order to achieve the above object, according to the invention, there is provided a liquid ejecting apparatus, comprising:

- a liquid ejecting head;
- a platen, opposed to the liquid ejecting head to support an object to which a liquid droplet is ejected from the liquid ejecting head and to define a gap between the liquid ejecting head and the object, the platen formed with a groove hole to which a liquid droplet deviated from an edge of the object is disposed, and through holes formed in a bottom portion of the groove hole;
- a tray member, arranged below the platen to receive liquid dropped through the through holes;
- a first liquid absorber, provided in the groove hole;
- a second liquid absorber, provided in the tray member, and
- at least one liquid leading member, extending through at least one of the through holes to lead liquid absorbed by the first liquid absorber to the second liquid absorber.

[0015] In such a configuration, the liquid is hardly held in the lower part of the first waste liquid absorber. Also in the case where the liquid ejecting apparatus is inclined greatly in handling or transportation, there can be eliminated a drawback that the liquid held in the first waste liquid absorber is collected into the end part of the platen

and then overflows to the outside. Consequently, a safety can be enhanced in the handling or the transportation.

[0016] Preferably, the liquid leading member is a third liquid absorber having a liquid absorbance higher than a liquid absorbance of the first liquid absorber.

[0017] In such a configuration, the liquid leading member can be obtained inexpensively and easily. The "high liquid absorbance" means that the capillary action is relatively remarkable so that the same amount of liquid can be spread over a wider area.

[0018] Here, it is preferable that a liquid absorbance of the second liquid absorber is higher than the liquid absorbance of the third liquid absorber.

[0019] In such a configuration, the liquid can be reliably led into the tray member.

[0020] Preferably, the through hole in which the liquid leading member is provided is placed at a position where a flushing operation of the liquid ejecting head is performed.

[0021] In the liquid ejecting apparatus, a so-called flushing (recovery) operation in which liquid is idly ejected is performed so that the nozzle orifice of the liquid ejecting head is not clogged up. The flushing operation is carried out in the vicinity of the end of the primary scanning region (the first direction) of the liquid ejecting head. In the position where the flushing operation is performed, accordingly, the liquid is disposed in a larger amount.

[0022] According to the above configuration, therefore, the function of the liquid leading member can be exhibited more effectively. Thus, the problem related to the overflow of the ink can be solved more reliably.

[0023] Here, it is preferable that the position at which the flushing operation is performed is not located at a home position of the liquid ejecting head.

[0024] In such a configuration, even in the case where an electronic component is arranged on the away position side, the liquid overflow problem can be solved by the function of the liquid leading member, and there is no anxiety that the electronic component might be adversely influenced.

[0025] Preferably, the through hole in which the liquid leading member is provided is placed at a position where a lower position of the platen which is an inclined state.

[0026] The platen is elongated in a first direction. In some cases in which the platen is provided in the liquid ejecting apparatus, it is inclined at a predetermined angle in the first direction by the influence of precision in a component or precision in an assembly. By such an inclination, the liquid disposed into the groove hole would be collected into the lower side so that the liquid overflow problem is apt to arise.

[0027] However, according to the above configuration, the function of the liquid leading member can be exhibited at the lower side where the liquid would be collected. Thus, the liquid overflow problem can be prevented reliably.

[0028] Preferably, the liquid leading member is an individual member comprised of a porous material.

[0029] In such a configuration, since the liquid leading member and the second liquid absorber are provided separately, one which has conventionally been used can be utilized exactly as the second liquid absorber. Therefore, a considerable change in a design is not required on the liquid ejecting apparatus.

[0030] Preferably, the liquid leading member is a sheet-like member having a portion to be extended through the at least one of the through holes.

[0031] In such a configuration, it is possible to easily form the liquid leading member by slightly processing the liquid absorber which has conventionally been used, and a considerable change in a design is not required. Therefore, a production efficiency can be enhanced.

[0032] Here, it is preferable that the liquid leading member has a size which is at least equal to a movable range of the liquid ejecting head in the first direction.

[0033] In such a configuration, in a case where the size of the object is set within the movable range of the liquid ejecting head, the disposed liquid can be reliably absorbed in the liquid leading member even if the liquid is deviated from all the edges of the object. As a result, the liquid can be ejected to all the edges of targets having various shapes.

[0034] It is also preferable that the liquid leading member is fitted into the groove hole, and the first liquid absorber is laminated thereon.

[0035] In such a configuration, by setting the total thickness of the first liquid absorber and the liquid leading member to be smaller than the depth of the groove hole, it is possible to prevent the object from coming in contact with the first liquid absorber when the object is supported by the platen. As a result, it is possible to prevent the object from being contaminated with the liquid absorbed in the first liquid absorber.

[0036] Preferably, a tip end of the liquid leading member which is to be brought into contact with the second liquid absorber is cut out obliquely.

[0037] In such a configuration, a capillary action can easily be generated between the liquid leading member and the second liquid absorber, so that the liquid absorbed in the liquid leading member can readily be moved to the second liquid absorber.

[0038] Preferably, a liquid absorbance of the liquid leading member is different from a liquid absorbance of the second liquid absorber.

[0039] In such a configuration, by setting the liquid absorbance of the second liquid absorber to be higher than that of the liquid leading member, the liquid absorbed in the liquid leading member can easily be moved to the second liquid absorber. As a result, even if the liquid ejecting apparatus is inclined by the transportation between users, the liquid does not leak out of the platen. Moreover, a time taken for the liquid to stay in the liquid leading member is shortened. Therefore, it is possible to prevent the liquid from being dried and solidified in the liquid leading member.

[0040] Preferably, the first liquid absorber is comprised

of a material having a first density, and the liquid leading member is comprised of a material having a second density.

[0041] In such a configuration, by using a material having a relatively lower density for the first liquid absorber and a material having a relatively higher density for the liquid leading member, for example, a mist generated by liquid disposed into the groove hole can be absorbed by the material having the lower density. Thus, the generation of the mist can be decreased. Furthermore, the liquid absorbed in the material having the lower density is easily moved toward the material side having the higher density by a capillary action. Consequently, the liquid can be moved quickly to the liquid leading member, whereby the liquid can be moved to the second liquid absorber more reliably.

[0042] Preferably, the platen is operable to support a plurality of objects having different sizes, and the through holes are located so as to correspond to edges of the objects.

[0043] In such a configuration, the through holes are provided in places where the liquid is frequently disposed, that is, places where the liquid tends to be collected. Consequently, the liquid can be efficiently moved toward the second liquid absorber side.

[0044] Preferably, the liquid ejecting apparatus is an ink jet recording apparatus in which an ink droplet is ejected toward a recording medium supported by the platen.

BRIEF DESCRIPTION OF THE DRAWINGS

[0045] The above objects and advantages of the present invention will become more apparent by describing in detail preferred exemplary embodiments thereof with reference to the accompanying drawings, wherein:

Fig. 1 is a perspective view showing the appearance of an ink jet printer according to a first embodiment of the invention;

Fig. 2 is a sectional side view showing a recording section of the ink jet printer of Fig. 1;

Fig. 3 is a perspective view showing the appearance of a platen in the ink jet printer of Fig. 1;

Fig. 4 is a plan view showing the platen;

Fig. 5 is a transverse section view showing a main part of the ink jet printer of Fig. 1;

Fig. 6 is a longitudinal section view showing a main part of the platen and a waste liquid tray in the ink jet printer of Fig. 1;

Fig. 7 is a perspective view showing the appearance of an ink jet printer according to a second embodiment of the invention;

Fig. 8 is a plan view showing a recording section in the ink jet printer of Fig. 7, showing a condition that the marginless printing for a leading end of a sheet is performed;

Fig. 9 is a sectional side view showing the recording section in the ink jet printer of Fig. 7, showing a con-

dition that the marginless printing for a leading end of a sheet is performed;

Fig. 10 is a plan view showing the recording section in the ink jet printer of Fig. 7, showing a condition that the marginless printing for a trailing end of a sheet is performed;

Fig. 11 is a sectional side view showing the recording section in the ink jet printer of Fig. 7, showing a condition that the marginless printing for a trailing end of a sheet is performed;

Fig. 12 is a perspective view showing the appearance of a main part of the ink jet printer of Fig. 7;

Fig. 13 is an enlarged perspective view showing the main part of the ink jet printer of Fig. 7;

Fig. 14 is a sectional side view showing the main part of the ink jet printer of Fig. 7;

Fig. 15 is an exploded perspective view showing the appearance of a platen and a waste liquid absorber in the ink jet printer of Fig. 7;

Fig. 16 is an enlarged section view showing the platen in the ink jet printer of Fig. 7;

Fig. 17 is a partially broken perspective view showing the appearance of an ink jet printer according to a third embodiment of the invention;

Fig. 18 is a transverse section view showing a main part of the ink jet printer of Fig. 17;

Fig. 19 is an exploded perspective view showing a platen and waste ink absorbers in the ink jet printer of Fig. 17; and

Fig. 20 is a plan view showing the platen in the ink jet printer of Fig.

17.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0046] A first embodiment of the invention will be described below with reference to Figs. 1 through 6.

[0047] In Fig. 1, an ink jet printer 100 (hereinafter referred to as "printer") as a liquid ejecting apparatus comprises a feeder 1 to feed an uppermost one of sheets stacked thereon toward an ink jet recording head 8 (which will be hereinafter referred to as a "recording head": see Fig. 2) provided under a carriage 3, at which recording is performed, and the sheet is ejected to a sheet discharge stacker 5 after the recording is carried out.

[0048] The carriage 3 mounts an ink cartridge 4 which supplies ink to the recording head 8. Moreover, the carriage 3 inserts a carriage guide shaft 7 provided between side frames 6a and 6b constituting the base member of the printer 100 and is guided in a primary scanning direction by the carriage guide shaft 7. The carriage 3 is reciprocated in the primary scanning direction by a driving member which is not shown.

[0049] In Fig. 1, a lower right side is defined as a "home position side" and an upper left side is defined as an "away position side". When the carriage 3 is placed at

the home position side, the recording head 8 may be subjected to a maintenance operation such as capping or cleaning. When the carriage 3 is placed as the away position side, the recording head 8 may be subjected to a so-called flushing operation for performing the idle injection of ink so that ink in the nozzle orifice of a nozzle array 9 is not clogged up.

[0050] Next, the structure of the recording section of the printer 100 will be described with reference to Fig. 2. In Fig. 2, a delivery roller 2 is constituted by a delivery driving roller 2a to be rotated and a delivery driven roller 2b to be driven via a pressure contact with the delivery driving roller 2a, and a sheet S fed from the upstream side (the right side in Fig. 2) by the feeder 1 is nipped between the delivery driving roller 2a and the delivery driven roller 2b and is delivered to a portion provided under the recording head 8.

[0051] The nozzle array 9 for ejecting ink is provided on the recording head 8. The sheet S delivered to the lower part of the recording head 8 is subjected to the recording operation performed by ejecting ink from the nozzle array 9. At this time, the sheet S is supported from below by a platen 10 arranged opposite to the recording head 8 so that a distance from the nozzle array 9 to the sheet S (sheet gap) is defined.

[0052] More specifically, ribs 11a and 11b are formed in the upper part of the platen 10, and the sheet S is supported by the ribs 11a and 11b from below. Groove holes 12a and 12b extended in a primary scanning direction are formed in the upstream and downstream sides of the rib 11b, respectively. The ink deviated from the leading and trailing ends of the sheet S is disposed into the groove holes 12a and 12b so that marginless printing is executed on the leading end side and trailing end side of the sheet S. More specifically, when the leading end of the sheet S is positioned above the groove hole 12b, a part 9b of the nozzle array 9 is driven to eject ink into a portion deviated from the leading end of the sheet S, thereby executing the marginless printing at the leading end. At this time, the ink deviated from the leading end of the sheet S is disposed into the groove hole 12b. When the trailing end of the sheet S is positioned above the groove hole 12a, similarly, the part 9a of the nozzle array 9 is driven to eject ink into the portion deviated from the trailing end of the sheet S, thereby executing the marginless printing at the trailing end.

[0053] The groove holes 12a and 12b are provided with a first waste liquid absorber 17 (see Figs. 1 and 6) which is not shown for simplicity of Fig. 2. The structure of the platen 10 including the first waste liquid absorber 17 will be described later in more detail.

[0054] Next, a sheet discharge roller 53 to be rotated is provided on the downstream side of the platen 10. The sheet discharge roller 53 is constituted by a sheet discharge driving roller 53a to be rotated and a sheet discharge driven roller 53b to be driven via a contact with the sheet discharge driving roller 53a. The sheet S recorded by the recording head 8 is nipped between the

sheet discharge driving roller 53a and the sheet discharge driven roller 53b and is delivered to the lower part of the discharged sheet stacker 5.

[0055] The structure of the platen 10 will be described below with reference to Figs. 3 to 6.

[0056] As shown in Figs. 3 and 4, the platen 10 has an elongated shape in the primary scanning direction (the direction of a sheet width) and a plurality of ribs 11 a and 11 b formed on the upper surface of the platen 10 at a predetermined interval in the primary scanning direction. The groove holes 12a and 12b are formed on the upstream and downstream sides of the rib 11 b so as to be extended in the primary scanning direction of the platen 10.

[0057] The groove holes 12a and 12b are used for the marginless printing of the leading and trailing ends of the sheet as described above, and groove holes for carrying out the marginless printing at the left and right ends of the sheet are formed in positions indicated as the designations of "a" to "g" in Fig. 3 so as to be localized in positions corresponding to the width of the sheet. More specifically, the groove is formed between two adjacent ribs 11 b in the positions indicated as the designations of "a" to "g".

[0058] The groove hole to be formed in the position "a" is placed on the most home position side, and the ends on the home position side in sheets having all sizes pass through the groove hole formed in the position "a". The groove holes to be formed in the positions "b" to "g" are placed on the away position side of the sheet, and the positions "b" to "g" are formed to correspond to an end on the away position side of sheets having various sizes. In the marginless printing to be carried out the left and right ends of the sheet, the ink is disposed into the groove hole formed in the position "a" and any of the groove holes formed in the positions "b" to "g". Consequently, the marginless printing is executed at the left and right ends of the sheet.

[0059] In Figs. 3 and 4, the first waste liquid absorber 17 are not shown for simplicity of the drawings. All the groove holes formed in the plate 10 are provided with the first waste liquid absorber 17 to fill up them.

[0060] Through holes indicated as the designations of 13a, 13b, 13c, 13d and 13g (which will be hereinafter referred to as through holes 13) in Fig. 4 are formed in the bottom portions of a part of the groove holes provided in the positions "a" to "g". The through holes 13 are formed in the bottom portions of the groove holes formed in the positions indicated as "a", "b", "c", "d" and "g". Consequently, the ink disposed into the platen 10 is dropped downward from the through holes 13.

[0061] As shown in Fig. 5, the ink dropped downward from the through holes 13 is stored in the waste liquid tray 15 provided in the lower part of the platen 10 (the position of arrangement in the printer 100 is shown in Fig. 1). The waste liquid tray 15 is almost box-shaped and includes a second waste liquid absorber 16 for absorbing ink to fill up the waste liquid tray 15. Accordingly,

the ink dropped downward from the through hole 13 is stored in the waste liquid tray 15 and is reliably held therein by the second waste liquid absorber 16 without the ink easily overflowing to the outside even if the printer 100 is inclined.

[0062] As shown in Fig. 6, the first waste liquid absorber 17 is provided in the groove hole 12a, 12b formed on the platen 10. The first waste liquid absorber 17 may be formed by any material having a high ink absorbance and a high ink-resistance. For example, a synthetic fiber such as polyethylene terephthalate, acryl or rayon, a felt material formed of pulp or a porous material such as a sponge can be used. This is also common to the second waste liquid absorber 16 and the third waste liquid absorber 14 which will be described below. In the embodiment, a sponge (for example, a trade name of "Ever Light" manufactured by BRIDGESTONE CORPORATION) is used for the first waste liquid absorber 17. The ink disposed into the platen 10 is first absorbed by such a first waste liquid absorber 17.

[0063] The third waste liquid absorber 14 is provided under the waste liquid absorber 17. The third waste liquid absorber 14 is provided in only the groove hole formed in the position "g" as shown in Fig. 6, that is, a groove hole formed on the most away position side in the platen 10 (see Fig. 5) and is provided to hang downward via the through hole 13g. In other words, the third waste liquid absorber 14 is provided to connect the bottom portion of the first waste liquid absorber 17 to the top of the second waste liquid absorber 16. In the embodiment, "Belleater" (a trade name of Kanebo, LTD.) is used for the third waste liquid absorber 14. In the embodiment, moreover, a nonwoven fabric (manufactured by OJI QUINOCROSS CO., LTD., for example) is used for the second waste liquid absorber 16 provided in the waste liquid tray 15.

[0064] The ink absorbance of each of the first waste liquid absorber 17, the second waste liquid absorber 16 and the third waste liquid absorber 14 is relatively set to be increased in order of the first waste liquid absorber 17, the third waste liquid absorber 14 and the second waste liquid absorber 16.

[0065] Description will be given to the functions and advantages of the first to third waste liquid absorbers constituted as described above. The ink disposed into the groove hole formed in the platen 10 is first absorbed in the first waste liquid absorber 17. The whole ink thus absorbed is not always dropped quickly from the through hole 13 into the waste liquid tray 15. More specifically, a part of the ink is dropped from the through hole 13 toward the waste liquid tray 15 and is then absorbed in the second waste liquid absorber 16, while the other part is held in the lower part of the first waste liquid absorber 17 because of the ink holding property of the first waste liquid absorber 17.

[0066] When the printer 100 is greatly inclined in such a state at time of the handling or transportation of a user, for example, the ink held in the lower part of the first waste

liquid absorber 17 would be collected into the end part of the platen 10 (the groove hole on the most away position side shown in Fig. 6, for example) and might overflow out of the platen 10 in the worst case. When such a phenomenon arises, there is also an anxiety that the components of the printer 100 (for example, a driving system or an electric system) might be adversely influenced, and furthermore, the ink might leak out of the printer 100.

[0067] Therefore, the through hole 13g formed in the groove hole on the most away position side is provided with the third waste liquid absorber 14 as shown in Fig. 6. The third waste liquid absorber 14 has a higher ink absorbance than the first waste liquid absorber 17. Accordingly, the third waste liquid absorber 14 serves as a waste liquid leading member to lead the ink from the lower part of the first waste liquid absorber 17 to the second waste liquid absorber 16. The second waste liquid absorber 16 has a higher ink absorbance than the third waste liquid absorber 14. Therefore, the ink is smoothly transferred from the third waste liquid absorber 14 to the second waste liquid absorber 16.

[0068] As described above, accordingly, the ink is hard to be held in the first waste liquid absorber 17. Consequently, it is possible to eliminate the drawback that the ink is collected into the end part of the platen 10 and overflows to the outside when the printer 100 is inclined. Thus, it is possible to enhance safety in handling or transportation.

[0069] In the printer 100 according to the embodiment, particularly, since the position on the away position side where the third waste liquid absorber 14 is provided acts as the flushing position of the recording head 8, the ink is disposed into that place most remarkably in the platen 10 which is elongated in the primary scanning direction. Consequently, the advantages of the waste liquid leading member can be enhanced still more. At the same time, the third waste liquid absorber 14 is not provided in all of the through holes 13 (13a, 13b, 13c and 13g) localized in the primary scanning direction but in only the most effective place in the embodiment. Consequently, an increase in a cost can be prevented. However, it is apparent that the third waste liquid absorber 14 may be provided in all the through holes 13 to lead the ink to the waste liquid tank 15 reliably.

[0070] In addition, in some cases in which the platen 10 is provided in the printer 100, either the home position side or the away position side is inclined depending on precision in a component or precision in an assembly. In these cases, the ink is intensively collected on the low position side so that it is apt to overflow as described above. In such cases, therefore, the third waste liquid absorber 14 is provided in the through hole 13 on the low position side so that it is possible to more reliably eliminate a drawback that the ink overflows as described above.

[0071] Next, an ink jet printer (hereinafter referred to as a "printer") 200 as a liquid ejecting apparatus according to a second embodiment of the invention will be de-

scribed with reference to Figs. 7 to 11.

[0072] The printer 200 comprises a feeder in the rear part of the apparatus (an upper left part in Fig. 7) which is not shown in detail, and feeds cut-form sheets one by one to the recording section (see Fig. 9). Moreover, the feeder includes a rolled sheet holder 228 so that a rolled sheet R can be set to be freely rotatable. In the embodiment, the medium which can be fed by the feeder will be collectively referred to as a sheet S.

[0073] The recording section provided on the downstream side of the feeder includes a delivery roller having a delivery driving roller 201a and a delivery driven roller 201b as shown in Fig. 9. The delivery driving roller 201a is rotated by a driving motor which is not shown and the delivery driven roller 201b is rotated via a pressure contact with the delivery driving roller 201a. The delivery roller nips the sheet S fed by the feeder from the upstream side in a delivery direction (the left side in Fig. 9) by the delivery driving roller 201a and the delivery driven roller 201b, and the delivery driving roller 201a is then rotated in the nip state so that the sheet S is delivered (fed precisely) to a portion provided under an ink jet recording head (hereinafter referred to as a "recording head") 207.

[0074] The recording head 207 is provided in the bottom portion of a carriage 209 as shown in Fig. 7. The carriage 209 mounts an ink cartridge which supplies ink to the recording head 207. The carriage 209 is provided to insert a carriage guide shaft 226 extended in parallel with a primary scanning direction of the recording head 207 and is driven by a driving motor which is not shown, and is thus reciprocated in the primary scanning direction (a direction of an arrow X in Fig. 7).

[0075] Returning to Fig. 9, the recording head 207 has a nozzle array 208 from which ink is ejected. The sheet S delivered to the lower part of the recording head 207 is subjected to ink ejection from the recording head 207 to perform printing. At this time, the sheet S is supported from below by a platen 203 provided opposite to the recording head 207 so that a distance with the nozzle array 208 (sheet gap) is defined.

[0076] Marginless printing to be carried out over the sheet S will be described with reference to Figs. 8 to 11. In Fig. 8, the platen 203 is elongated in the primary scanning direction (a transverse direction in Fig. 8) and ribs 204, 205 and 206 are formed on a platen surface (the upper surface of the platen 203 : an opposed surface to the recording head 207) so as to extend in the delivery direction (secondary scanning direction) and arranged at a predetermined interval in the primary scanning direction as shown in Fig. 8.

[0077] Moreover, two groove holes 210 and 211 extended in the primary scanning direction are formed on the platen surface of the platen 203 as shown in Fig. 8, and furthermore, square groove holes 212 to 216 (see Fig. 15) are formed in portions to be positioned on the side edges of the sheet S. The groove holes 210 and 211 are formed to have predetermined depths from the recording head 207 as shown in Fig. 9. Moreover, the

groove holes 212 to 216 are also formed to have almost the same depths as those of the groove holes 210 and 211. While a waste liquid absorber for absorbing an ink drop is provided in the groove holes 210 to 216, it will be described below in detail.

[0078] The groove holes 210, 211 and 212 to 216 are used for disposing away ink (liquid) to print four sides of the sheet S without a margin and the ink ejected from the nozzle array 208 is disposed into the groove holes 212 to 216. For example, in the marginless printing at the leading end of the sheet S, when the leading end of the sheet S reaches the upper part of the groove hole 211 positioned on the downstream side in the delivery direction as shown in Figs. 8 and 9, only a part 208b of the nozzle array 208 is driven to eject ink drop onto the sheet S. Consequently, the ink drop deviated from the leading end of the sheet S is disposed into the groove hole 211. Accordingly, the platen surface can be prevented from being contaminated with the ink drop.

[0079] On the other hand, in the marginless printing at the trailing end of the sheet S, when the trailing end of the sheet S reaches the upper part of the groove hole 210 positioned on the upstream side in the delivery direction as shown in Figs. 10 and 11, only the part 208a of the nozzle array 208 is driven to eject ink onto the sheet S. Consequently, the ink drop deviated from the trailing end of the sheet S is disposed into the groove hole 210. Accordingly, the platen surface can be prevented from being contaminated with the ink.

[0080] In the marginless printing on both side ends of the sheet S, the groove holes 212 to 216 fulfill the same functions. More specifically, in the sheet S shown in a virtual line of Figs. 8 and 10, the ink drop deviated from both side ends of the sheet S is disposed into the groove hole 212 and the groove hole 216. As shown in Fig. 15, moreover, the groove holes 212 to 216 are provided to be localized at a predetermined interval in the primary scanning direction. More specifically, the groove hole 212 is provided in a place through which one of the side ends of each of the sheets P having all sizes passes, and the groove holes 213 to 216 are provided in places through which the other side end of each of the sheets P having predetermined sizes (for example, an A4 size, a postcard size and an L-type photograph size having a width of 89 mm) passes. Accordingly, four-side marginless printing can be executed over the predetermined sheet sizes.

[0081] A sheet discharge roller including a sheet discharge driving roller 202a and a sheet discharge driven roller 202b is provided on the downstream side of the platen 203 as shown in Fig. 9. The sheet discharge driving roller 202a is provided on a roller shaft 202c to be rotated and driven by a driving motor (not shown) so as to be localized in the transverse direction of the sheet S, and the sheet discharge driven roller 202b is rotated in accordance with the rotation of the sheet discharge driving roller 202a. The sheet S is nipped by the sheet discharge driving roller 202a and the sheet discharge

driven roller 202b and the sheet discharge driving roller 202a is rotated so that the sheet S subjected to printing is ejected toward a discharged sheet stacker 225 (Fig. 7).

[0082] With reference to Figs. 12 to 16, subsequently, detailed description will be given to a waste liquid treating device for treating ink drop disposed into the platen 203 by the marginless printing.

[0083] The waste liquid treating device has a first waste liquid absorber shown in Fig. 15, a waste liquid tray 222 and a second waste liquid absorber 224 shown in Fig. 13, a liquid leading member 230a, and a guide member 223.

[0084] In Fig. 15, the first waste liquid absorber 230 is provided to be filled in the groove holes 210 to 216 formed in the platen 203 to first absorb the ink drop disposed into the groove holes 210 to 216. The first waste liquid absorber 230 may be formed by any material having a high ink absorbance and a high ink-resistance. For example, a synthetic fiber such as polyethylene terephthalate, acryl or rayon, a felt material formed of pulp or a porous material such as a sponge can be used. This is also common to the second waste liquid absorber 224 which will be described below. In the embodiment, a foaming soft material (a so-called sponge material : for example, a trade name of "Ever Light" manufactured by BRIDGESTONE CORPORATION) is used for the first waste liquid absorber 230.

[0085] The first waste liquid absorber 230 is provided with a plurality of holes 230c to keep away from the rib 205 formed on the platen 203. Consequently, all the groove holes 210 to 216 can be filled with a single and integrally formed first waste liquid absorber 230. Moreover, the first waste liquid absorber 230 is formed with a plurality of tongue piece sections 230b serving as a waste liquid leading member which will be described below.

[0086] As shown in Fig. 15, each of the tongue piece sections 230b is formed to be extended in the primary scanning direction through a connecting section 230d. The respective connecting sections 230d are formed at both ends of the first waste liquid absorber 230 and a portion shifted from a longitudinal center portion of the first waste liquid absorber 230 to the home position side (the right side in Fig. 15). When the first waste liquid absorber 230 is to be provided in the groove holes 210 to 216, the connecting section 230d is first wrenched and the tongue piece section 230b is thus set to be extended downward. Next, the tongue piece sections 230b are inserted into the through holes 217, 218 and 220 respectively continued from the groove holes 212, 213 and 216, and are thus caused to hang downward from the platen 203.

[0087] On the other hand, the waste liquid tray 222 which is elongated in the primary scanning direction and is almost-box shaped as shown in Fig. 13 is provided under the platen 203, and a second waste liquid absorber 224 is filled in the waste liquid tray 222 without a clearance. While the second waste liquid absorber 224 may be formed by any material having a high ink absorbance

and a high ink-resistance, a nonwoven fabric (manufactured by OJI QUINOCROSS CO., LTD., for example) is used in the embodiment. The lower end of the liquid leading member 230b hanging down from the platen 203 is maintained in contact with the upper surface of the second waste liquid absorber 224 provided in the waste liquid tray 222 (see Fig. 14).

[0088] The ink drop disposed into the groove holes 210 to 216 of the platen 203 is first absorbed in the first waste liquid absorber 230 provided in the groove holes 210 to 216 and proceeds to the bottom portion of the first waste liquid absorber 230, and then passes the through holes 217, 218, 219 and 220 formed in the platen 203 and is then absorbed in the second waste liquid absorber 224 provided thereunder.

[0089] In the case in which the waste liquid leading member 230b is not provided, for example, the ink drop does not smoothly proceed from the first waste liquid absorber 230 toward the second waste liquid absorber 224 so that the ink drop is apt to stay in the bottom portion of the first waste liquid absorber 230. More specifically, although the first waste liquid absorber 230 has a high ink absorbance, it easily holds the absorbed ink drop so that the ink drop stays in the bottom portion of the first waste liquid absorber 230.

[0090] When the printer 200 is greatly inclined in such a state by the handling of a user or in transportation, for example, the ink drop held in the bottom portion of the first waste liquid absorber 230 would be collected into the end portions of the groove holes 210 and 211, more specifically, the groove hole 212 or 216 portion shown in Fig. 15. In the worst case, there is an anxiety that the ink drop might overflow out of the platen 203. If such a phenomenon arises, there is also an anxiety that the components of the printer 200 (for example, a driving system or an electric system) might be adversely affected, and furthermore, the ink might leak out of the printer 200, resulting in the contamination of the appearance of the printer 200.

[0091] In the embodiment, therefore, the waste liquid leading member 230b is provided to hang downward from the through holes 217, 218 and 220 and the lower end thereof is caused to come in contact with the upper surface of the second waste liquid absorber 224 as shown in Figs. 13 and 14. In this case, the liquid absorbance of the second waste liquid absorber 224 acts on the waste liquid leading member 230b and the first waste liquid absorber 230. Consequently, the ink drop does not stay in the bottom portion of the first waste liquid absorber 230 but smoothly proceeds to the second waste liquid absorber 224 side.

[0092] In other words, there is provided the waste liquid leading member 230b for reaching the upper surface of the second waste liquid absorber 224 from the groove holes 210 to 216 via the through holes 217, 218 and 220, thereby connecting the first waste liquid absorber 230 to the second waste liquid absorber 224 to smoothly lead the ink drop from the first waste liquid absorber 230 to

the second waste liquid absorber 224. Also in the case in which the printer 200 is greatly inclined in handling or transportation, it is possible to eliminate a drawback that the ink drop staying in the bottom portion of the first waste liquid absorber 230 is collected into the end of the platen 203 and overflows to the outside. Thus, a safety can be maintained during the handling or the transportation.

[0093] In the case in which the platen 203 is provided in the printer 200 in such a manner that either the home position side or the away position side is inclined depending on precision in a component or precision in an assembly, the ink would be collected at the low position side so that the ink is apt to overflow as described above. Also in such a case, according to the embodiment, the ink drop is smoothly absorbed in the second waste liquid absorber 224 in the lower part. Consequently, the problem of the ink overflow described above can be solved more reliably.

[0094] In the embodiment, such a structure as to obtain advantages is further employed as will be described below. In the embodiment, a difference in a height (an interval "a" in Fig. 14) between the upper surface of the second waste liquid absorber 224 and the bottom portion of the platen 203 is approximately 40 to 50 mm. Accordingly, the waste liquid leading member 230b vertically hangs downward from the through holes 217, 218 and 220 almost straight as shown in Fig. 14. Consequently, the ink passing through the waste liquid leading member 230b forms a long water column so that force for leading the ink drop staying in the bottom portion of the first waste liquid absorber 230 to the second waste liquid absorber 224, that is, sucking force is increased still more. In the embodiment, accordingly, the ink can be led from the first waste liquid absorber 230 to the second waste liquid absorber 224 still more reliably.

[0095] The waste liquid leading member 230b is provided integrally with the first waste liquid absorber 230. As compared with the case in which the waste liquid leading member 230b and the first waste liquid absorber 230 are constituted separately, the waste liquid leading member 230b can be provided at a very low cost.

[0096] In the embodiment, the liquid absorbance of the second waste liquid absorber 224 is constituted to be higher than that of each of the first waste liquid absorber 230 and the waste liquid leading member 230b. Consequently, it is possible to increase such a degree (sucking force) that the second waste liquid absorber 224 draws the liquid from the first waste liquid absorber 230 and the waste liquid leading member 230b. Accordingly, the liquid can be led from the first waste liquid absorber 230 to the second waste liquid absorber 224 still more reliably. The "high liquid absorbance" implies that the capillary action of the second waste liquid absorber 224 is more remarkable than that of each of the first waste liquid absorber 230 and the waste liquid leading member 230b and the liquid is absorbed in the same amount within a wider range.

[0097] The through holes 217 and 220 are provided

on both ends of the groove holes 210 and 211 extended in the primary scanning direction and the internal wall surfaces of the through holes 217 and 220 are made flush with the side walls of both ends of the groove holes 210 and 211 (the side walls of the groove holes 212 and 210), and the waste liquid leading member 230b is provided to reach the upper surface of the second waste liquid absorber 224 along the side walls of both ends of the groove holes 210 and 211 (the side walls of the groove holes 212 and 216) and the internal wall surfaces of the through holes 217 and 220 linked to the side walls. Fig. 16 shows, as a typical example, the sections of the groove hole 216 and the through hole 220.

[0098] As shown in this figure, a side wall 216a of the groove hole 216 and a side wall 220a of the through hole 220 are made flush with each other. The waste liquid leading member 230b is provided to hang downward along the side wall 216a and the side wall 220a (which is not shown in Fig. 16). In other words, in the case in which the printer 200 is greatly inclined in such a manner that the groove hole 216 side is set into the lower side, the ink would be collected into the groove hole 216. At this time, if the side wall 220a of the through hole 220 is positioned in an upper part than the side wall 216a of the groove hole 216 (the right side in Fig. 16), for example, an ink staying portion having the side wall 216a to be a bottom portion is formed. Consequently, there is an anxiety that the ink might overflow from the staying portion.

[0099] In order to eliminate the ink staying portion when the printer 200 is inclined in this way, the side wall 220a of the through hole 220 is made flush with the side wall 216a of the groove hole 216, and the waste liquid leading member 230b is provided in the same portion. Consequently, it is possible to reliably solve the problem of the ink overflow described above. In the embodiment, furthermore, the first waste liquid absorber 230 is provided to reliably cause an end face thereof to come in contact with the side wall 216a of the groove hole 216 (which is not shown). Consequently, the ink is smoothly led downward in the same manner.

[0100] The platen 203 is provided with the through holes 218 and 219 in the positions slightly shifted from the longitudinal center portion toward the home position side in addition to the through holes 217 and 220 on both longitudinal ends, and the waste liquid leading member 230b is provided in the through hole 218. Consequently, the ink drop disposed into the groove holes 210 to 216 can be led to the second waste liquid absorber 224 (the waste liquid tray 222) still more smoothly in the case in which the printer 200 is usually installed in a horizontal state to be used as well as the case in which the printer 200 is inclined.

[0101] As shown in Figs. 13 and 14, the guide member 223 is provided under the platen 203. The guide 223 is formed by bending a transparent and flexible sheet material to have an almost V shape seen from a side as shown in Fig. 14, and has an elongated shape in the primary scanning direction in the same manner as the

platen 203. An upper end of the guide member 223 is fixed to the platen 203.

[0102] A plurality of slits 223a extended in a vertical direction as shown in Fig. 13 are formed on the side wall at the front side (the right side of Fig. 14) at a predetermined interval in the longitudinal direction (the primary scanning direction) of the platen 203. Each of the slits 223a is formed in a place which is almost coincident with the position in which the waste liquid leading member 230b hanging downward from the platen 203 is provided, so that the waste liquid leading member 230b is inserted through the slit 223a to reach the upper surface of the second waste liquid absorber 224 as shown in Fig. 13.

[0103] Accordingly, the attitude and position of each waste liquid leading member 230b hanging downward is restrained by each slit 223a. Consequently, the attitude and position of each waste liquid leading member 230b is not changed but determined uniformly without the influence of a variation in an assembly or a vibration generated by transportation.

[0104] More specifically, the lower end of the waste liquid leading member 230b comes in contact with the upper surface of the second waste liquid absorber 224 so that the ink is led from the first waste liquid absorber 230 to the second waste liquid absorber 224. If the lower end of the waste liquid leading member 230b does not come in contact with the upper surface of the second waste liquid absorber 224 due to the variation in an assembly or the vibration generated by the transportation, for example, the above described advantages cannot be obtained. However, the attitude and position of each liquid leading member 230b is restrained by the guide member 223 (the slits 223a). Consequently, the ink can be always led reliably from the first waste liquid absorber 230 to the second waste liquid absorber 224.

[0105] As shown in Figs. 13 and 14, an electronic unit 227 is provided on the rear side of the guide member 223. The electronic unit 227 is formed by a housing having an electromagnetic shielding property. When the waste liquid leading member 230b wetted with the ink drop comes in contact with the electronic unit 227, the ink drop might enter the electronic unit 227, resulting in a deterioration in the electrical characteristic of the electronic unit 227. However, the slits 223a are formed on only the wall surface at the front side of the sheet material bent to have the almost V shape and is not formed on the wall surface at the rear side (the left side of Fig. 14). Consequently, the waste liquid leading member 230b does not come in contact with the electronic unit 227. Thus, the electrical characteristic of the electronic unit 227 is not deteriorated.

[0106] Moreover, a cover member 221 for covering the upper part of the waste liquid tray 222 is provided on the front side of the guide member 223 as shown in Figs. 12 and 14. Therefore, the amount of forward movement of the guide member 223 is regulated so that the attitude and position of the waste liquid leading member 230b can be held still more reliably.

[0107] Next, a third embodiment of the invention will be described with reference to Figs. 17 to 20. As shown in Fig. 17, an ink jet printer 311 as a liquid ejecting apparatus comprises a printer body 312 and a feeder 312a provided on the rear side of the printer body 312. Sheets S stacked on the feeder 312a are fed into the printer body 312 one by one.

[0108] The printer body 312 includes a case 313 having the shape of an almost rectangular parallelepiped and a carriage guide shaft 314 is provided between both of left and right side plates 313a and 313b of the case 313. A carriage 315 is slidably supported on the carriage guide shaft 314. The carriage 315 is coupled to a carriage motor 316 through a timing belt 317 and is driven in a direction of an arrow in the drawing, that is, a primary scanning direction by the driving operation of the carriage motor 316.

[0109] Moreover, an ink cartridge 318 for storing ink (liquid) is removably attached to the upper side of the carriage 315, and a recording head 319 as a liquid ejecting head for receiving the supply of ink from the ink cartridge 318 is provided on the lower side of the carriage 315. The recording head 319 includes a nozzle driving member formed by a piezoelectric vibrator (which is not shown) and serves to eject an ink drop downward from a nozzle formation surface (not shown) based on the vibrating action of the nozzle driving member.

[0110] As shown in Figs. 17 and 18, moreover, a platen 321 is provided in parallel with the carriage guide shaft 314 under a portion in which the recording head 319 is to be scanned. The sheet S fed by the feeder 312a is guided onto the platen 321, and is delivered by a sheet feeding member (not shown) in a secondary scanning direction which is orthogonal to the scanning direction of the carriage 315, and the ink is ejected from the recording head 319 over the platen 321 so that a character and an image are printed on the sheet S.

[0111] As shown in Fig. 18, the platen 321 is constituted by a platen base 322 to be a plate-shaped base member, a first liquid absorber 324 and a third liquid absorber 323. More specifically, as shown in Figs. 19 and 20, the platen base 322 is formed of resin and formed with a concave portion 326 having the shape of an almost rectangular parallelepiped on an upper surface 322a. The concave portion 326 is provided in such a size as to include the movable range of the recording head 319 in the primary scanning direction.

[0112] A plurality of cylindrical convex portions 327 and a plurality of rectangular parallelepiped-shaped convex portions 328 are protruded upward from a bottom surface 326a of the concave portion 326. An upper surface 327a of the cylindrical convex portion 327 and an upper surface 328a of the rectangular parallelepiped-shaped convex portion 328 have a height which is coincident with the upper surface 322a of the platen base 322. Moreover, two or three hemispherical portions 329 are provided on the upper surface 328a of each of the rectangular parallelepiped-shaped convex portions 328. In the platen base

322, accordingly, the upper end of the hemispherical portion 329 is placed in the highest position.

[0113] Furthermore, the platen base 322 includes a through hole 331 having an almost rectangular section to penetrate through the bottom surface 326a of the concave portion 326. Three through holes 331 are arranged in the primary scanning direction as shown in Fig. 18.

[0114] The printer 311 according to this embodiment can carry out marginless printing. In Fig. 18, the through hole 331 formed on the rightmost side is provided in such a position as to receive an excessive ink deviated from the right edge of the sheet S when the marginless printing is executed. Moreover, two other through holes are provided in such positions as to receive an excessive ink deviated from the left edge of the sheet S when the sheet S having a rated size, for example, an A4 size or a post-card size is guided onto the platen 321. The sheet S shown in Fig. 18 has the A4 size and the margin of the sheet S overlaps with the through hole 331 on the leftmost side. The structure of the platen base 322 has conventionally been used.

[0115] The third liquid absorber 323 is formed by a porous material having a great sucking force and has an outer shape in a plane direction which is almost coincident with the concave portion 326 of the platen base 322. Moreover, a thickness is approximately a quarter of the whole depth of the concave portion 326 of the platen base 322. As shown in Fig. 20, the third liquid absorber 323 has an opening portion 333 in such positions as to overlap with the cylindrical convex portion 327 and the rectangular parallelepiped convex portion 328 of the platen base 322. The above structure has conventionally been employed.

[0116] In addition to the conventional structure, moreover, the third liquid absorber 323 is newly provided with a plurality of tongue piece sections (waste liquid leading members) 335 in such positions as to overlap with three through holes 331 provided in the platen base 322. Each of the tongue piece sections 335 is formed by providing an U-shaped slit in the third liquid absorber 323 and then bending a portion inside the slit downward.

[0117] Moreover, a tip 335a of each tongue piece section 335 is cut obliquely with respect to the scanning direction of the carriage 315.

[0118] The third liquid absorber 323 is fitted in the concave portion 326 with the convex portions 327 and 328 penetrating through the opening portions 333. Moreover, the third liquid absorber 323 causes each tongue piece section 335 to hang downward via each of the through holes 331 of the platen base 322 in a fitting state in the concave portion 326 (see Fig. 18).

[0119] The first liquid absorber 324 is formed by a porous material having a lower density than the third liquid absorber 323 and has an outer shape in a plane direction which is almost coincident with the concave portion 326 of the platen base 322. Moreover, a thickness is approximately three quarters of the whole depth of the concave portion 326 of the platen base 322. The first liquid ab-

sorber 324 has an opening portion 337 in such positions as to overlap with the cylindrical convex portion 327 and the rectangular parallelepiped-shaped convex portion 328 of the platen base 322. The first liquid absorber 324 is fitted in the concave portion 326 to be superposed on the third liquid absorber 323 in such a state that the convex portions 327 and 328 penetrate through the opening portions 337.

[0120] Accordingly, the platen 321 is constituted by sequentially fitting the third liquid absorber 323 and the first liquid absorber 324 in the concave portion 326 of the platen base 322. In this case, as shown in Fig. 18, the upper surface 322a of the platen base 322 is positioned on almost the same level with an upper surface 324a of the first liquid absorber 324. As a result, only the hemispherical portion 329 formed on the rectangular parallelepiped-shaped convex portion 328 of the platen base 322 is protruded from the upper surface of the platen 321, and the sheet S guided onto the platen 321 is supported by the hemispherical portion 329 to form a predetermined sheet gap with the recording head 319.

[0121] As shown in Fig. 17, moreover, the printer 311 comprises a capping member 341 in a non-print region (a home position). The capping member 341 includes a wiping member 342, a cap 343, a sucking tube 344 connected to the cap 343, and a sucking pump 345 provided in the middle of the sucking tube 344 as shown in Fig. 18.

[0122] The wiping member 342 is provided on the print region side of the cap 343 and is constituted to sweep and clean the nozzle formation surface of the recording head 319 if necessary. The cap 343 is constituted to seal the nozzle formation surface of the recording head 319 of the carriage 315 moved to the home position, and serves as a cover member for preventing the nozzle formation surface of the recording head 319 from being dried for the deactivated period of the printer 311.

[0123] Moreover, the sucking pump 345 can apply a negative pressure into the cap 343 sealing the nozzle formation surface through the sucking tube 344, so that ink is sucked out from nozzle orifices, thereby carrying out cleaning for recovering the ink ejecting capability of the recording head 319.

[0124] Furthermore, the printer 311 comprises a waste liquid tank 346 having an upper side opened at a lower bottom part in the case 313. A plurality of second waste liquid absorber 347 formed by a porous material are stacked in the waste liquid tank 346. The end of the sucking tube 344 of the capping member 341 is positioned in the waste liquid tank 346 and the ink generated during the cleaning is fed into the waste liquid tank 346 and is absorbed and held in the second waste liquid absorber 347. The waste liquid tank 346 and the second waste liquid absorber 347 are positioned just below the platen 321, and furthermore, has such a size as to include a whole region in the longitudinal direction of the platen 321.

[0125] A distance between the platen 321 and the waste liquid tank 346 is set in such a manner that each

tongue piece section 335 of the third liquid absorber 323 comes in contact with the upper surface of the second waste liquid absorber 347. Moreover, the second waste liquid absorber 347 has a higher absorbance than the third liquid absorber 323 so that the liquid absorbed in the third liquid absorber 323 is easily moved to the second waste liquid absorber 347 through the tongue piece sections 335.

[0126] By the above structure, accordingly, in the case in which marginless printing for setting vertical and transverse margins to be zero is carried out in the printer 311, an ink drop ejected to a position deviated from the edge of the sheet S is caused to fly toward the first liquid absorber 324 of the platen 321. The ink drop is captured and absorbed by the first liquid absorber 324 and is then moved toward the third liquid absorber 323 provided on the lower side which has a higher absorbance.

[0127] The first liquid absorber 324 is formed by a porous material having a relatively lower density. Therefore, the ink is moved quickly to the third liquid absorber 323 so that the generation of an ink mist can be suppressed as greatly as possible in the vicinity of the surface of the first liquid absorber 324.

[0128] The ink moved to the third liquid absorber 323 is moved to the second waste liquid absorber 347 through the tongue piece sections 335 of the third liquid absorber 323. Each tongue piece section 335 is provided in a position overlapping with the through hole 331 of the platen base 322, that is, a position in which the ink deviated from the edge on the right side and the edge on the left side in the sheet S is concentrated in the platen 321. Accordingly, the ink is easily collected into the tongue piece sections 335 and is thus moved easily to the second waste liquid absorber 347. Then, the ink is held in the second waste liquid absorber 347 having a high water-holding property and hardly flows to the outside even if the printer 311 is inclined by mistake due to transportation between users.

[0129] In the embodiment, the through holes 331 are provided on the platen base 322 of the platen 321 to insert the tongue piece sections 335 and to cause the tongue piece sections 335 to come in contact with the second waste liquid absorber 347.

[0130] Accordingly, the ink disposed from the recording head 319 beyond the sheet S is absorbed in the tongue piece sections 335 and is absorbed in the second waste liquid absorber 347 via the through hole 331. As a result, the ink is quickly moved to the second waste liquid absorber 347 through the tongue piece sections 335 so that a time taken for a stay on the platen 321 is shortened. In the case in which the tongue piece sections 335 are not provided, the ink stays on the platen 321 until the absorption limits of the first absorber and the second absorber are reached. In the embodiment, however, the ink is moved to the second waste liquid absorber 347 before the absorption limit is reached. As a result, even if the printer 311 is inclined due to the transportation between users, the ink can be prevented from leaking out

of the platen 321.

[0131] In the embodiment, the tongue piece sections 335 and the second waste liquid absorber 347 are provided separately and the waste liquid absorber which has conventionally been used can be exactly used. Therefore, it is not necessary to considerably change the design of the printer 311.

[0132] In the embodiment, the tongue piece sections 335 are formed by cutting and bending the third waste liquid absorber 323 in a position of the platen base 322 overlapping with the through hole 331.

[0133] Accordingly, it is possible to easily form the tongue piece sections 335 by slightly processing the third liquid absorber 323 which has conventionally been used. Therefore, it is not necessary to considerably change the design of the printer 311.

[0134] In the embodiment, the third liquid absorber 323 and the first liquid absorber 324 have such sizes as to include the moving range of the recording head 319. When the size of the sheet S is included in the moving range of the recording head 319, accordingly, the disposed ink can be reliably absorbed in each of the liquid absorbers 323 and 324 even if the ejected ink is deviated from all the edges of the sheet S, that is, so-called overall marginless printing is carried out.

[0135] In the embodiment, the third liquid absorber 323 and the first liquid absorber 324 are fitted in the concave portion 326 of the platen base 322. In a state in which each of the liquid absorbers 323 and 324 is fitted, the hemispherical portion 329 of the platen base 322 is placed in the highest position. When the sheet S is supported on the platen 321, accordingly, a gap can be formed by the hemispherical portion 329 between the sheet S and the first liquid absorber 324 so that they can be prevented from coming in contact with each other. As a result, the sheet S can be prevented from being contaminated with the ink absorbed in each of the liquid absorbers 323 and 324.

[0136] In the embodiment, the tip 335a of each tongue piece section 335 is cut obliquely with respect to the scanning direction of the carriage 315. Accordingly, the capillary action can easily be generated between each tongue piece section 335 and the second waste liquid absorber 347 so that the ink absorbed in the tongue piece sections 335 can easily be moved to the second waste liquid absorber 347.

[0137] In the embodiment, the second waste liquid absorber 347 has a higher absorbance than the third liquid absorber 323. Accordingly, the ink absorbed in the tongue piece sections 335 can easily be absorbed in the second waste liquid absorber 347. As a result, even if the printer 311 is inclined due to the transportation between users, the ink can be prevented from leaking out of the printer 311. Consequently, the time in which the liquid stays in each of the liquid absorbers 323 and 324 is shortened so that the ink can be prevented from being dried and solidified in each of the liquid absorbers 323 and 324.

[0138] In the embodiment, the platen 321 is provided with two kinds of waste liquid absorbers, that is, the third liquid absorber 323 and the first liquid absorber 324. Accordingly, a mist generated by the ink disposed into the platen 321 can easily be absorbed by the first liquid absorber 324 formed by a material having a relatively lower density. As a result, the generation of the mist can be decreased. Moreover, the ink can easily be moved by the capillary action from the first liquid absorber 324 having the relatively lower density to the third liquid absorber 323 formed by a material having a relatively higher density. As a result, the ink can be quickly moved to the tongue piece sections 335 of the third liquid absorber 323. Thus, the ink can be moved to the second waste liquid absorber 347 more reliably.

[0139] In the embodiment, the through holes 331 formed on the platen base 322 are provided in the positions overlapping with the edges on the left and right sides of the sheet S having a rated size.

[0140] Accordingly, the through holes 331 and the tongue piece sections 335 are provided in a place in which the ink can easily be disposed, that is, a place in which the disposed ink tends to be concentrated. Thus, the ink can efficiently be moved toward the second waste liquid absorber 347 side.

[0141] The embodiment may be modified in the following manner

[0142] While each tongue piece section 335 is formed by providing a U-shaped slit in the third liquid absorber 323 and bending a portion inside the slit downward in the embodiment, it may be formed to have another shape. Moreover, each tongue piece section 335 is not integrated with the third liquid absorber 323 but may be provided separately therefrom and may be thus attached to the third liquid absorber 323 by connecting means such as an adhesive.

[0143] Furthermore, each tongue piece section 335 is not formed by cutting out the third liquid absorber 323 but may be formed by molding simultaneously with the molding of the third liquid absorber 323.

[0144] In the embodiment, each of the liquid absorbers 323 and 324 has such a size as to include the moving range of the recording head 319. They may be provided partially.

[0145] While the tip 335a of the tongue piece section 335 is cut out acutely in the embodiment, it does not need to be cut out.

[0146] Although the second waste liquid absorber 347 has a higher absorbance than the third liquid absorber 323 including the tongue piece section 335 in the embodiment, it may have an equal or lower absorbance.

[0147] While the third liquid absorber 323 and the first liquid absorber 324 having different densities are provided as the liquid absorbers in the embodiment, at least three kinds of waste liquid absorbers may be used. Moreover, only one kind of waste liquid absorber may be used.

[0148] In the embodiment, the through hole 331 of the platen base 322 and the tongue piece sections 335 are

provided in the positions overlapping with the edges on the left and right sides of the sheet S having a rated size. They may be provided in non-overlapping positions. While the number is set to be three, moreover, another number may be employed.

[0149] While the printer for ejecting ink (the printing apparatus including a facsimile and a copier) has been described as the liquid ejecting apparatus in the above embodiments, a liquid ejecting apparatus for ejecting another liquid may be employed. For example, it is also possible to employ a liquid ejecting apparatus for ejecting a liquid such as an electrode material or a colorant which is used for manufacturing a liquid crystal display, an EL display or an FED (a field emission display), a liquid ejecting apparatus for ejecting a biological organic matter to be used for manufacturing a biochip or a sample ejecting apparatus to be a precision pipette.

Claims

1. A liquid ejecting apparatus (100), comprising:

a liquid ejecting head (8),
 a platen (10), opposed to the liquid ejecting head (8) to support an object (5) to which a liquid droplet is ejected from the liquid ejecting head (8) and to define a gap between the liquid ejecting head (8) and the object (5), the platen (8) being formed with a groove hole (12a, 12b) to which a liquid droplet deviated from an edge of the object (5) is disposed, and through holes (13a, 13b, 13c, 13d, 13g) formed in a bottom portion of the groove hole (12a, 12b)
 a tray member (15), arranged below the platen (10) to receive liquid dropped through the through holes (13a, 13b, 13c, 13d, 13g);
 a first liquid absorber (17), provided in the groove hole (12a, 12b);
 a second liquid absorber (16), provided in the tray member (15); and
 at least one liquid leading member (14), extending through at least one of the through holes (13a, 13b, 13c, 13d, 13g) to lead liquid absorbed by the first liquid absorber (17) to the second liquid absorber (16).

2. The liquid ejecting apparatus as set forth in claim 1, wherein the liquid leading member is a third liquid absorber (14) having a liquid absorbance higher than a liquid absorbance of the first liquid absorber (17).

3. The liquid ejecting apparatus as set forth in claim 1, wherein the through hole in which the liquid leading member (14) is provided is placed at a position where a flushing operation of the liquid ejecting head (8) is performed.

4. The liquid ejecting apparatus as set forth in claim 3, wherein the position at which the flushing operation is performed is not located at a home position of the liquid ejecting head (8).

5. The liquid ejecting apparatus as set forth in claim 1, wherein the through hole in which the liquid leading member (14) is provided is placed at a position where a lower position of the platen (10) which is an inclined state.

6. The liquid ejecting apparatus as set forth in claim 2, wherein a liquid absorbance of the second liquid absorber (16) is higher than the liquid absorbance of the third liquid absorber (14).

7. The liquid ejecting apparatus as set forth in claim 1, wherein the liquid ejecting apparatus (100) is an ink jet recording apparatus in which an ink droplet is ejected toward a recording medium (5) supported by the platen (10).

Patentansprüche

1. Flüssigkeitsausstoßvorrichtung (100), umfassend:

einen Flüssigkeitsausstoßkopf (8),
 eine Druckplatte (10), die dem Flüssigkeitsausstoßkopf (8) gegenüberliegt, um einen Gegenstand (5) zu stützen, auf welchen ein Flüssigkeitstropfen von dem Flüssigkeitsausstoßkopf (8) ausgestoßen wird, und einen Spalt zwischen dem Flüssigkeitsausstoßkopf (8) und dem Gegenstand (5) zu definieren, wobei die Druckplatte (8) mit einem Nutloch (12a, 12b), zu welchem ein von einem Rand des Gegenstands (5) abgelenkter Flüssigkeitstropfen vorgesehen wird, und Durchgangslöchern (13a, 13b, 13c, 13d, 13g), die in einem Bodenabschnitt des Nutlochs (12a, 12b) gebildet sind, ausgeformt ist,
 ein Schachtelement (15), das unterhalb zur Druckplatte (10) vorgesehen ist, um durch die Durchgangslöcher (13a, 13b, 13c, 13d, 13g) getropfte Flüssigkeit zu empfangen;
 einen ersten Flüssigkeitsabsorbierer (17), der in dem Nutloch (12a, 12b) vorgesehen ist;
 einen zweiten Flüssigkeitsabsorbierer (16), der in dem Schachtelement (15) vorgesehen ist; und
 zumindest ein Flüssigkeitsleitelement (14), das sich durch zumindest eines der Durchgangslöcher (13a, 13b, 13c, 13d, 13g) erstreckt, um durch den ersten Flüssigkeitsabsorbierer (17) absorbierte Flüssigkeit zu dem zweiten Flüssigkeitsabsorbierer (16) zu leiten.

2. Flüssigkeitsausstoßvorrichtung nach Anspruch 1,

bei welcher das Flüssigkeitsleitelement ein dritter Flüssigkeitsabsorbierer (14) mit einem Flüssigkeitsabsorptionsvermögen ist, das höher ist als ein Flüssigkeitsabsorptionsvermögen des ersten Flüssigkeitsabsorbierers (17).

3. Flüssigkeitsausstoßvorrichtung nach Anspruch 1, bei welcher das Durchgangsloch, in welchem das Flüssigkeitsleitelement (14) vorgesehen ist, in einer Position platziert ist, in welcher ein Spülvorgang des Flüssigkeitsausstoßkopfes (8) ausgeführt wird.

4. Flüssigkeitsausstoßvorrichtung nach Anspruch 3, bei welcher die Position, in welcher der Spülvorgang ausgeführt wird, nicht in einer Homeposition des Flüssigkeitsausstoßkopfes (8) gelegen ist.

5. Flüssigkeitsausstoßvorrichtung nach Anspruch 1, bei welcher das Durchgangsloch, in welchem das Flüssigkeitsleitelement (14) vorgesehen ist, in einer Position platziert ist, in welcher eine untere Position der Druckplatte (10) ist, die in einem geneigten Zustand ist.

6. Flüssigkeitsausstoßvorrichtung nach Anspruch 2, bei welcher ein Flüssigkeitsabsorptionsvermögen des zweiten Flüssigkeitsabsorbierers (16) höher ist als das Flüssigkeitsabsorptionsvermögen des dritten Flüssigkeitsabsorbierers (14).

7. Flüssigkeitsausstoßvorrichtung nach Anspruch 1, bei welcher die Flüssigkeitsausstoßvorrichtung (100) eine Tintenstrahlaufzeichnungsvorrichtung ist, bei welcher ein Tintentropfen zu einem Aufzeichnungsmedium (5) ausgestoßen wird, das durch die Druckplatte (10) gestützt wird.

Revendications

1. Appareil d'éjection de liquide (100), comprenant :

une tête d'éjection de liquide (8),
un plateau (10), opposé à la tête d'éjection de liquide (8) pour supporter un objet (5) vers lequel une goutte de liquide est éjectée à partir de la tête d'éjection de liquide (8) et pour définir un espace entre la tête d'éjection de liquide (8) et l'objet (5), le plateau (8) étant formé avec un trou de rainure (12a, 12b) vers lequel une goutte de liquide déviée d'un bord de l'objet (5) est disposée, et des trous de passage (13a, 13b, 13c, 13d, 13g) formés dans une partie inférieure du trou de rainure (12a, 12b),
un élément formant plateau (15) agencé au-dessous du plateau (10) pour recevoir le liquide qui tombe par les trous de passage (13a, 13b, 13c, 13d, 13g) ;

un premier absorbeur de liquide (17), prévu dans le trou de rainure (12a, 12b) ;
un second absorbeur de liquide (16) prévu dans l'élément formant plateau (15) ; et
au moins un élément d'amenée de liquide (14), s'étendant à travers au moins l'un des trous de passage (13a, 13b, 13c, 13d, 13g) pour amener le liquide absorbé par le premier absorbeur de liquide (17) vers le second absorbeur de liquide (16).

2. Appareil d'éjection de liquide selon la revendication 1, dans lequel l'élément d'amenée de liquide est un troisième absorbeur de liquide (14) ayant une absorption de liquide supérieure à une absorption de liquide du premier absorbeur de liquide (17).

3. Appareil d'éjection de liquide selon la revendication 1, dans lequel le trou de passage dans lequel l'élément d'attaque de liquide (14) est prévu, est placé à une position où une opération de rinçage de la tête d'éjection de liquide (8) est réalisée.

4. Appareil d'éjection de liquide selon la revendication 3, dans lequel la position à laquelle l'opération de rinçage est réalisée, n'est pas située à une position de départ de la tête d'éjection de liquide (8).

5. Appareil d'éjection de liquide selon la revendication 1, dans lequel le trou de passage dans lequel l'élément d'amenée de liquide (14) est prévu, est placé à une position où une position inférieure du plateau (10) qui est un état incliné.

6. Appareil d'éjection de liquide selon la revendication 2, dans lequel l'absorption de liquide du second absorbeur de liquide (16) est supérieure à l'absorption de liquide du troisième absorbeur de liquide (14).

7. Appareil d'éjection de liquide selon la revendication 1, dans lequel l'appareil d'éjection de liquide (100) est un appareil d'enregistrement à jet d'encre dans lequel une goutte d'encre est éjectée vers un milieu d'enregistrement (5) supporté par le plateau (10).

FIG. 1

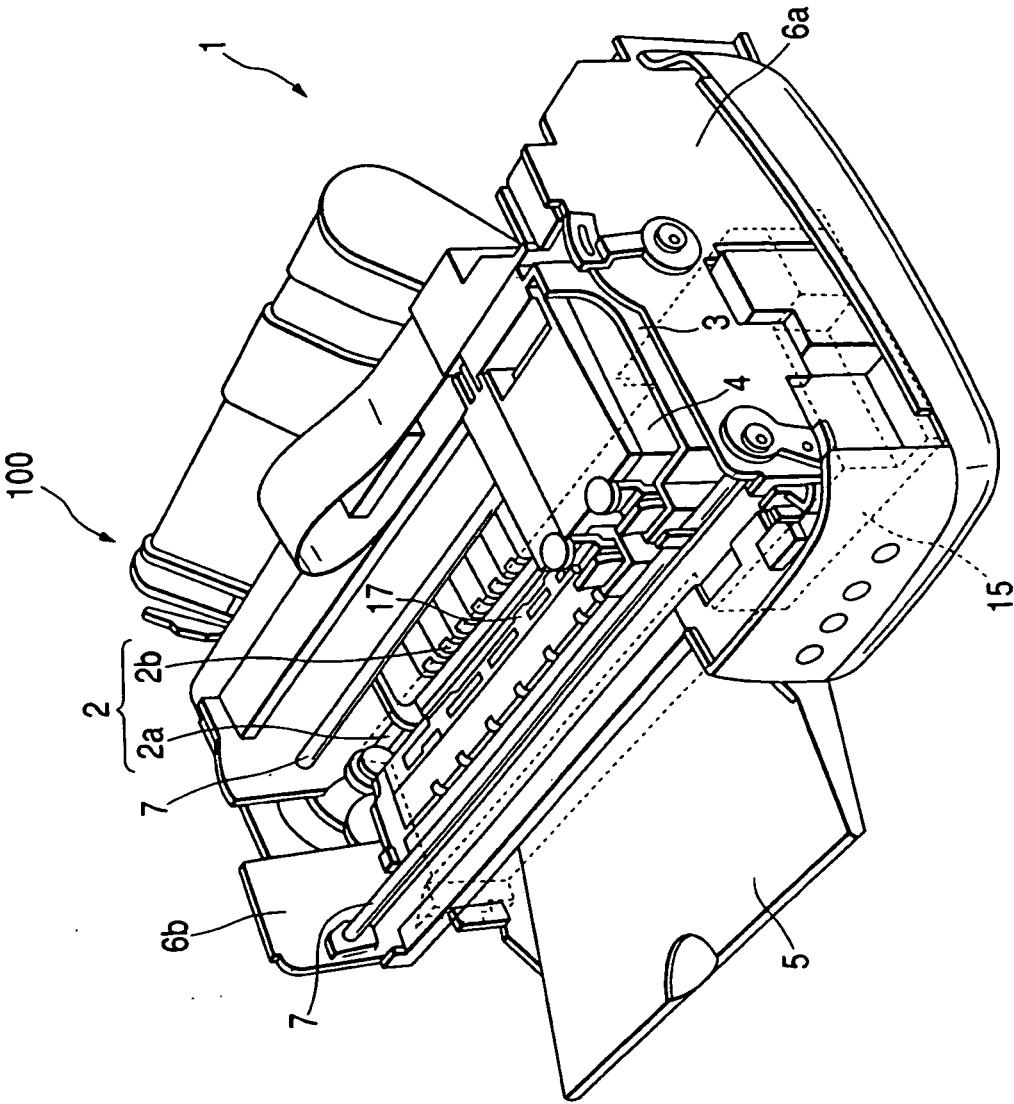


FIG. 2

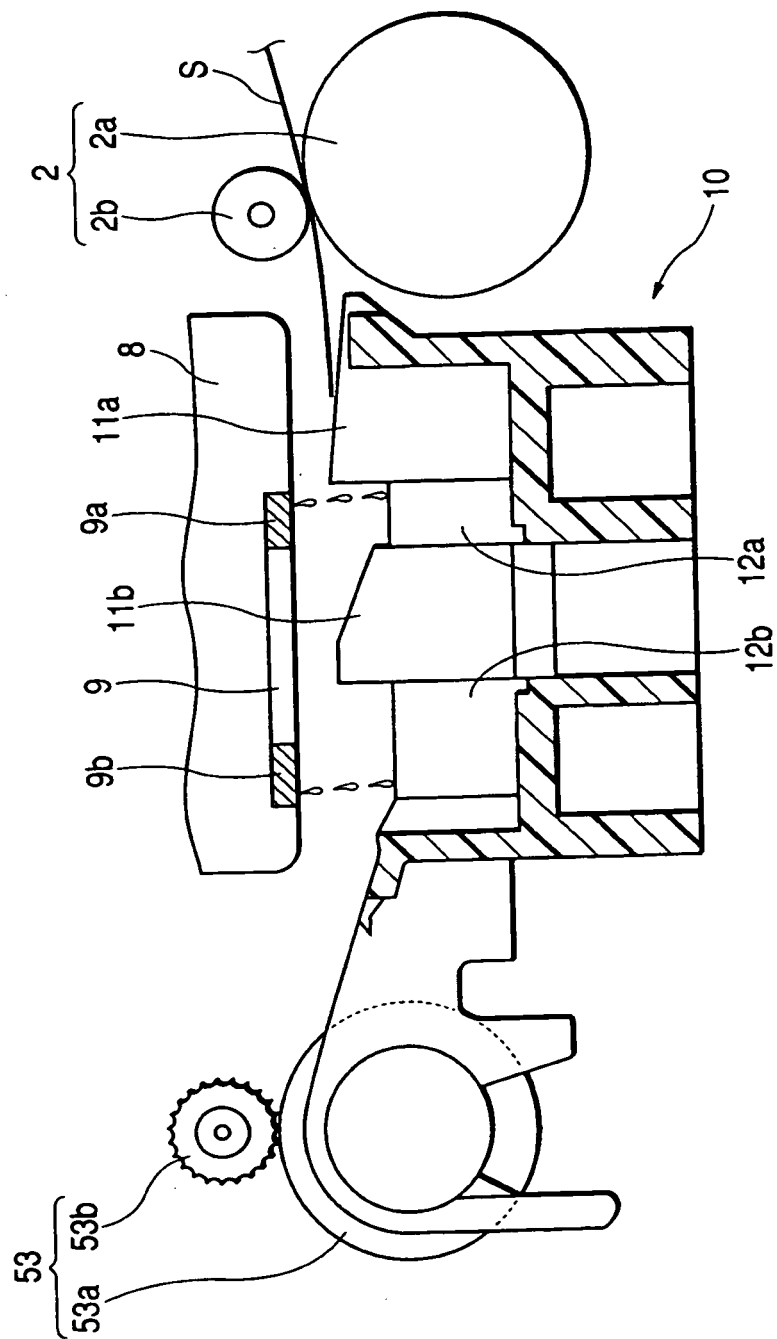


FIG. 3

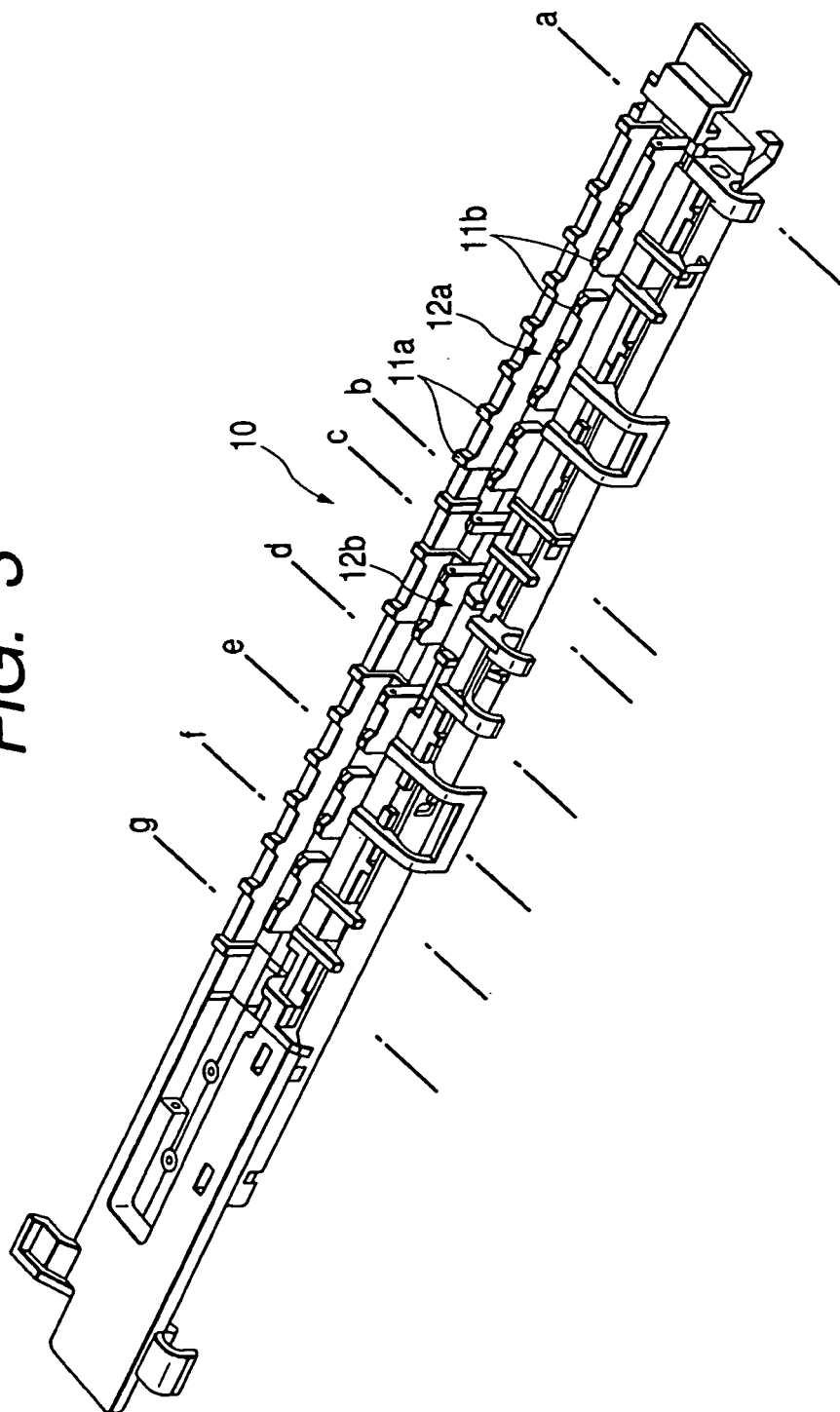


FIG. 4

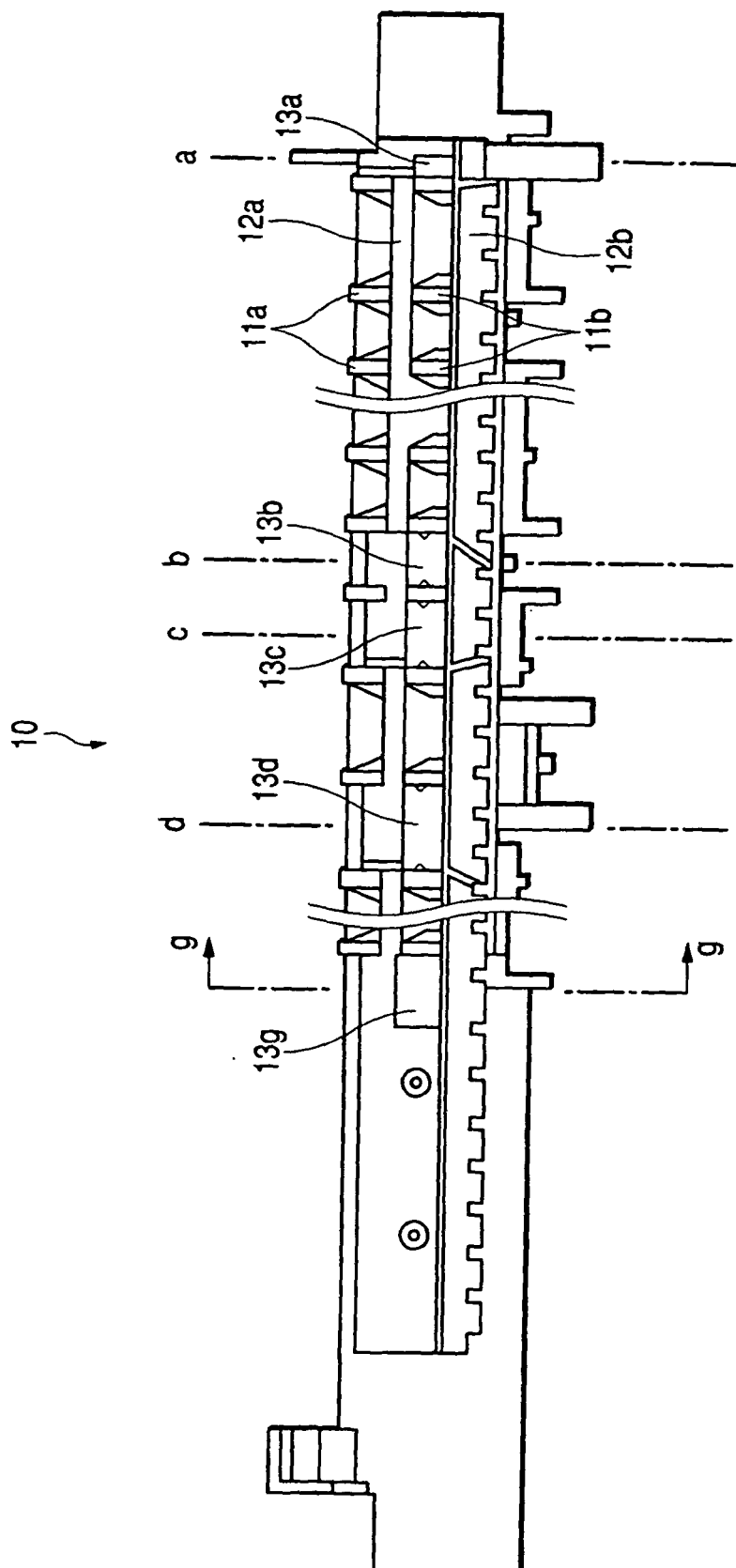


FIG. 5

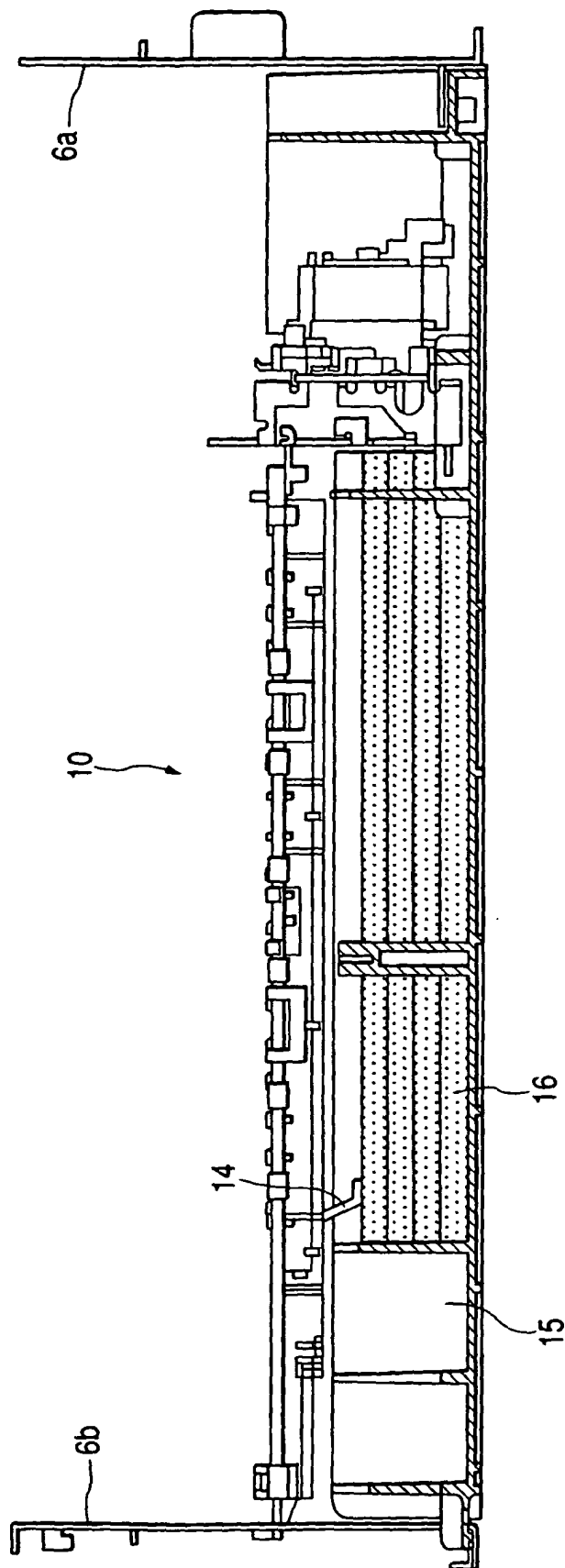


FIG. 6

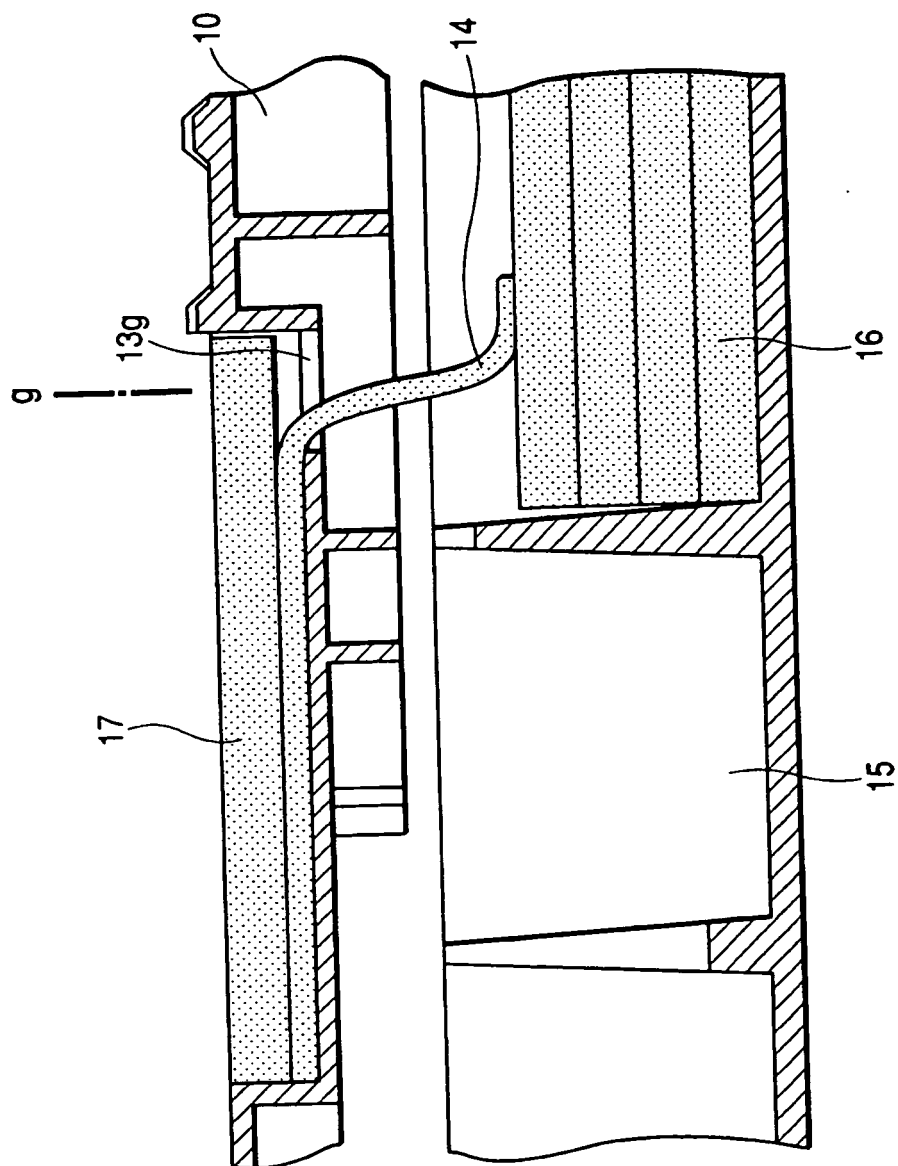
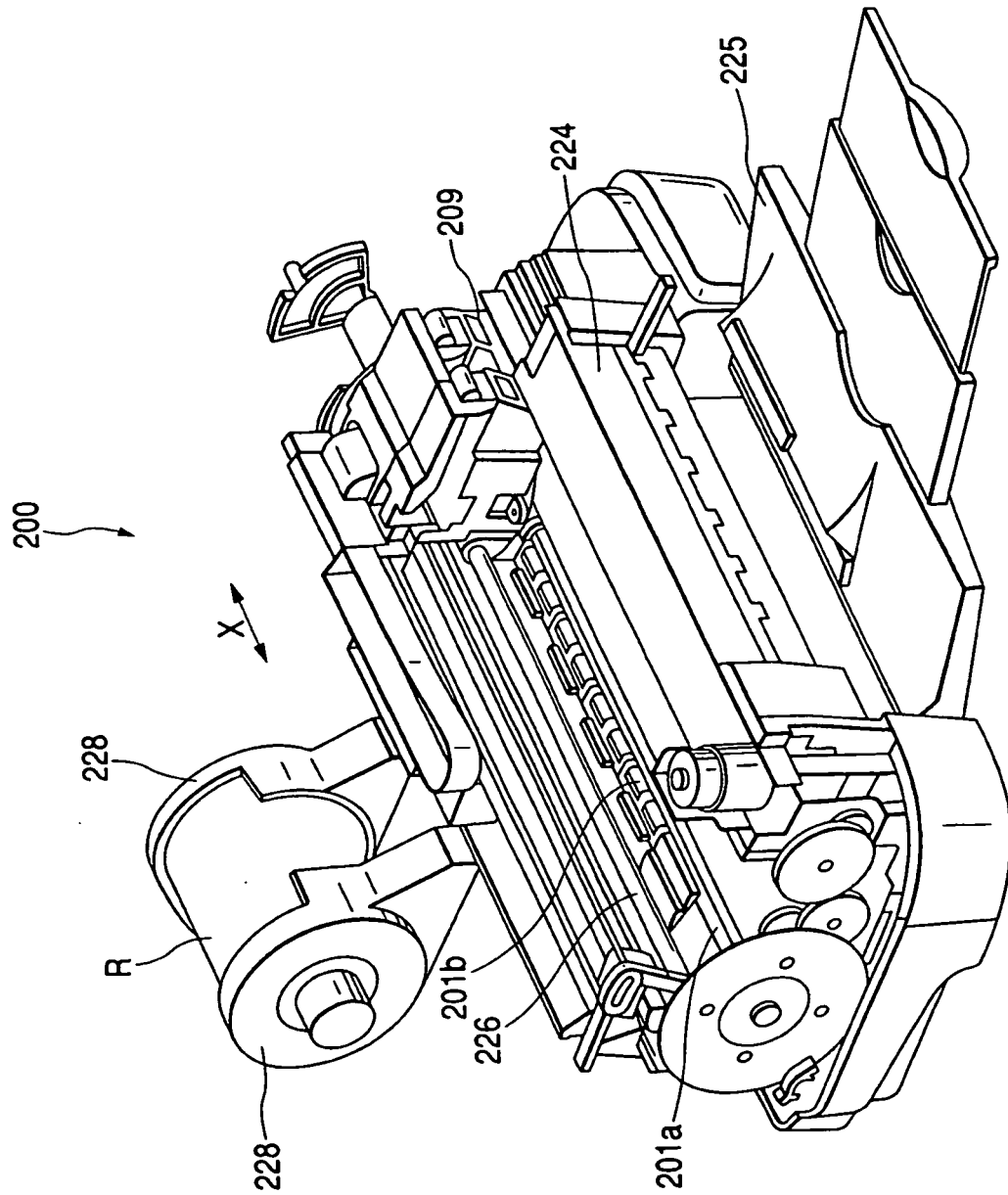


FIG. 7



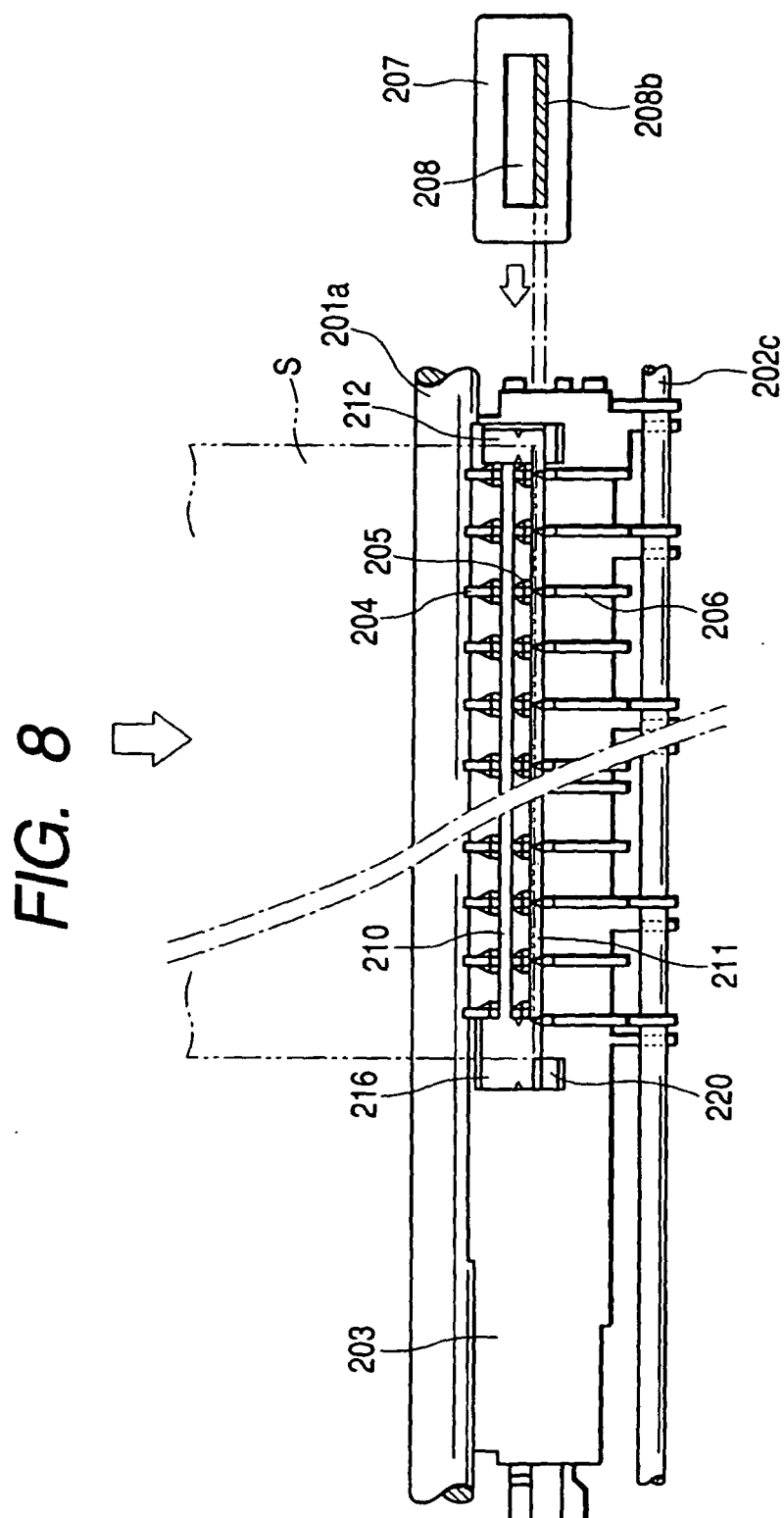


FIG. 9

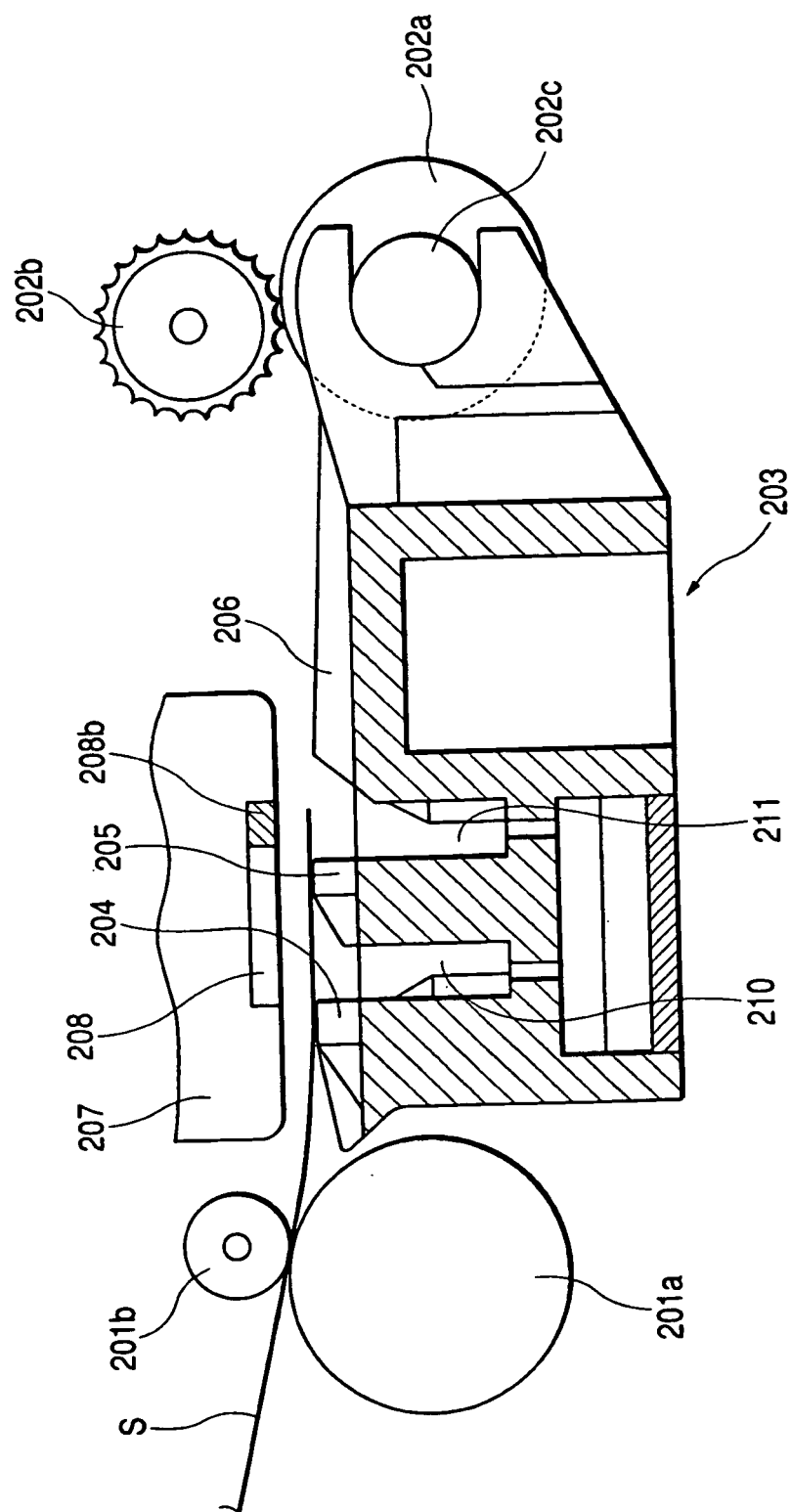


FIG. 10

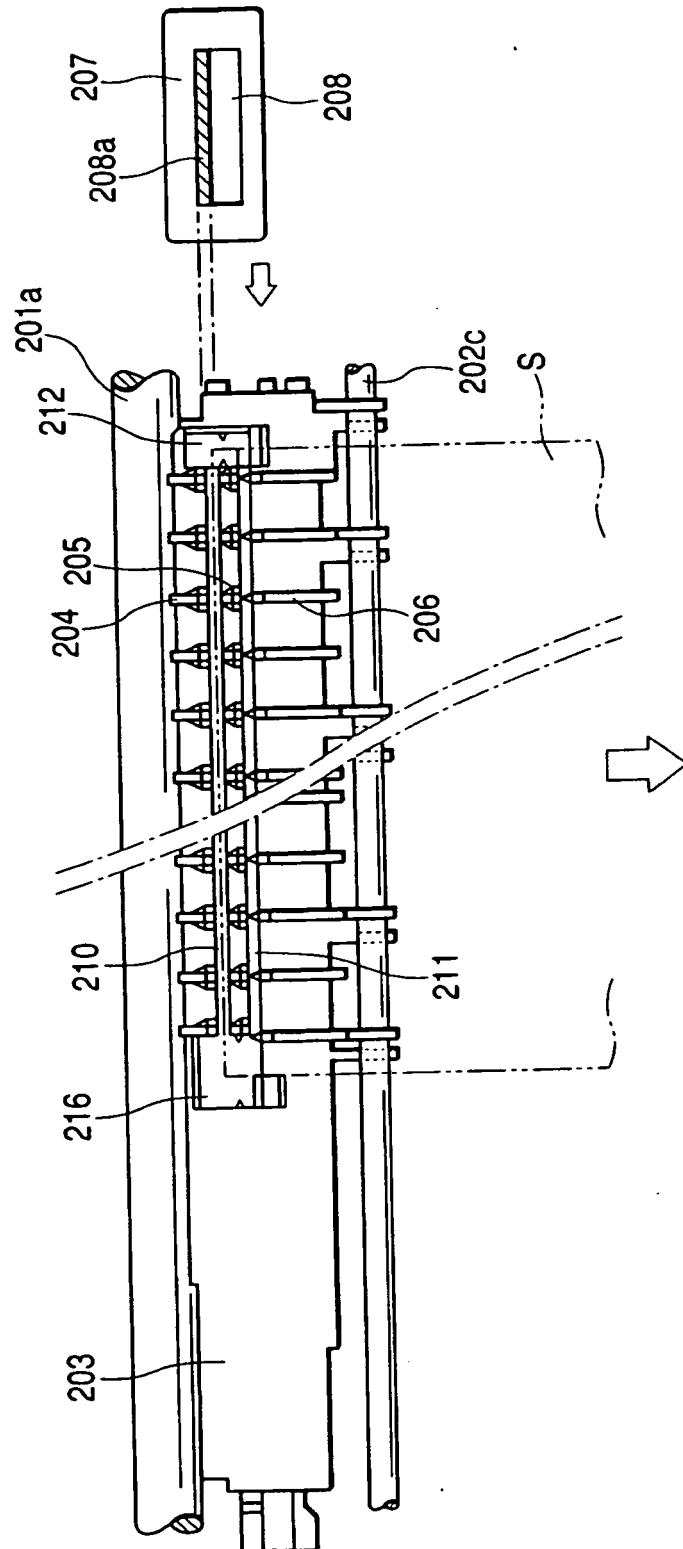


FIG. 11

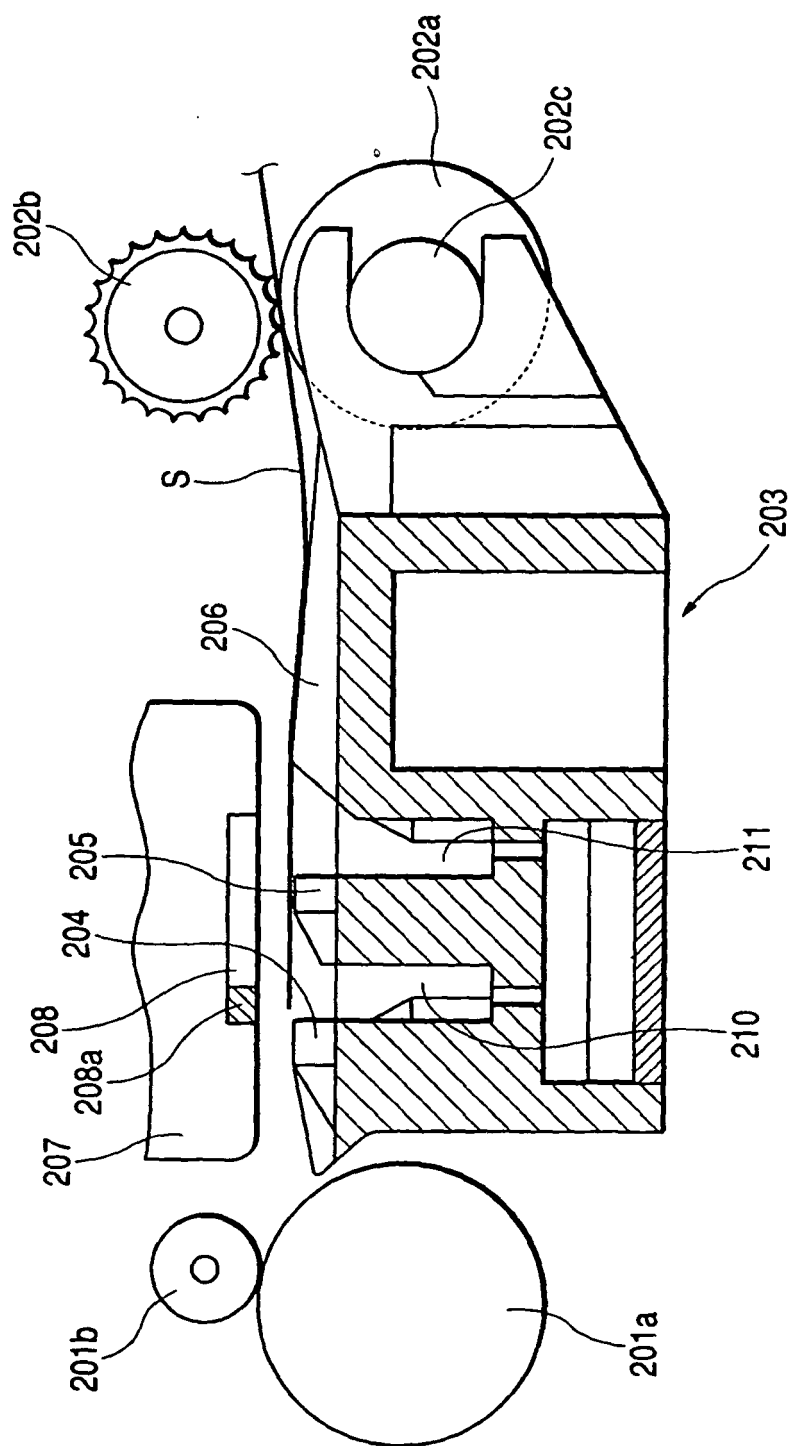


FIG. 12

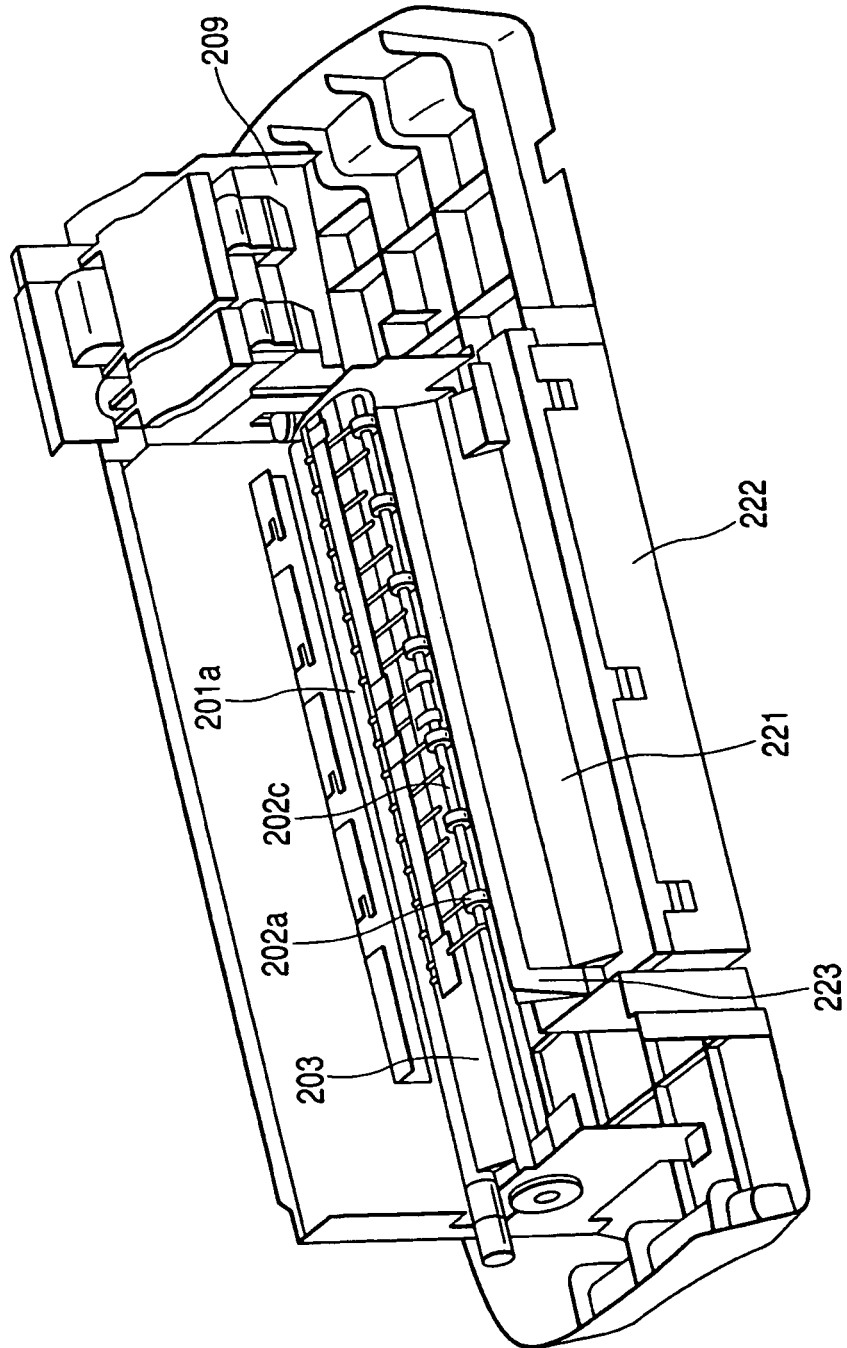


FIG. 13

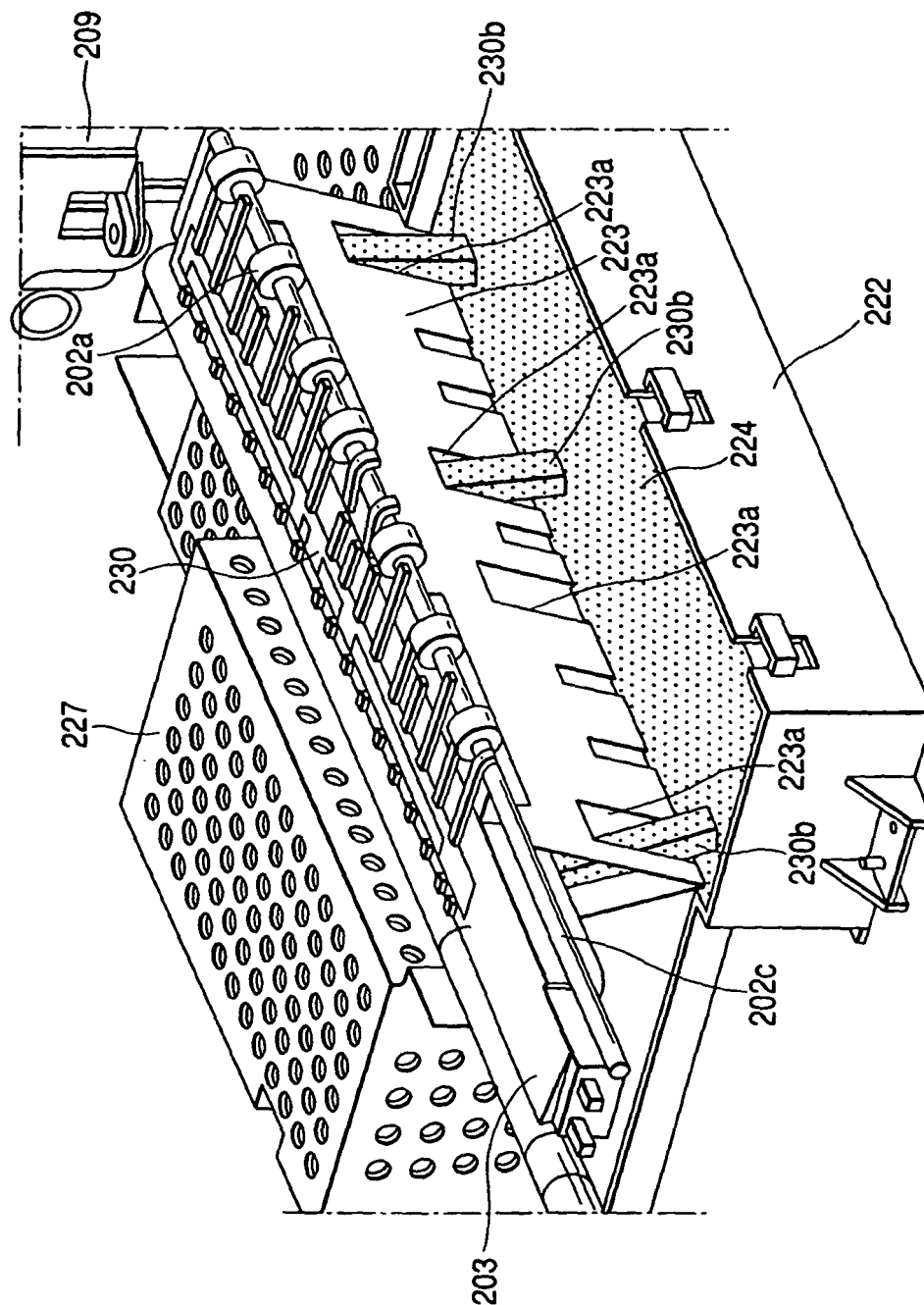


FIG. 14

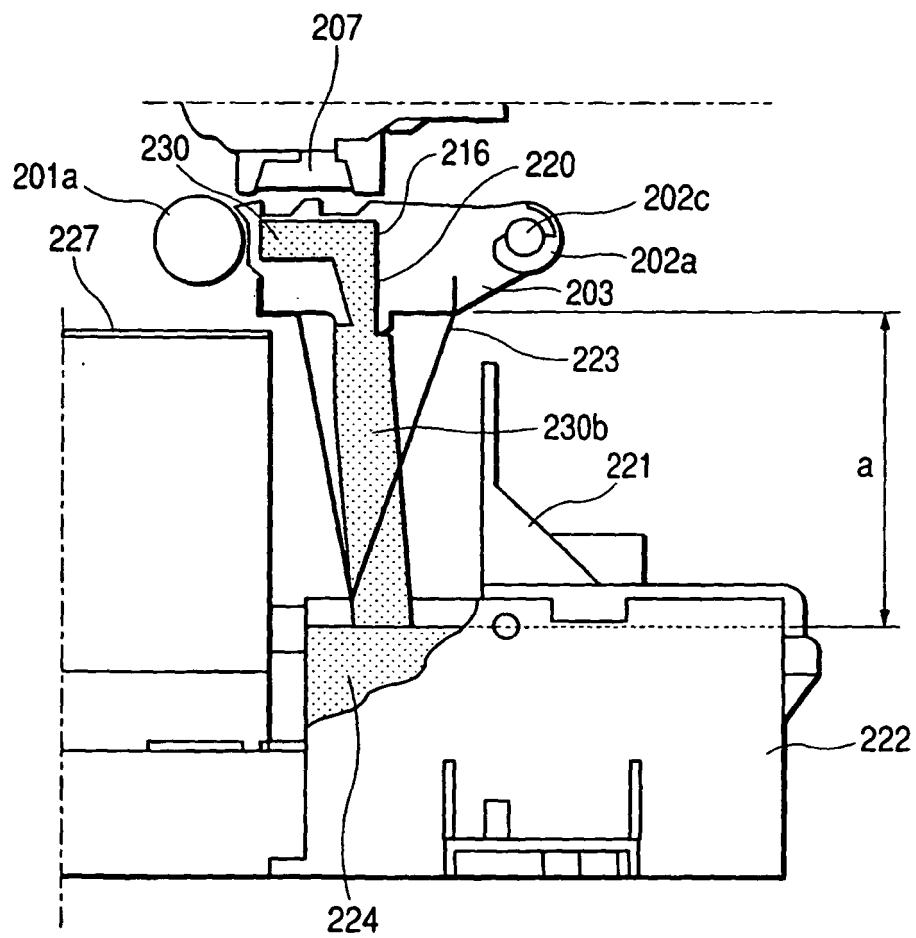


FIG. 15

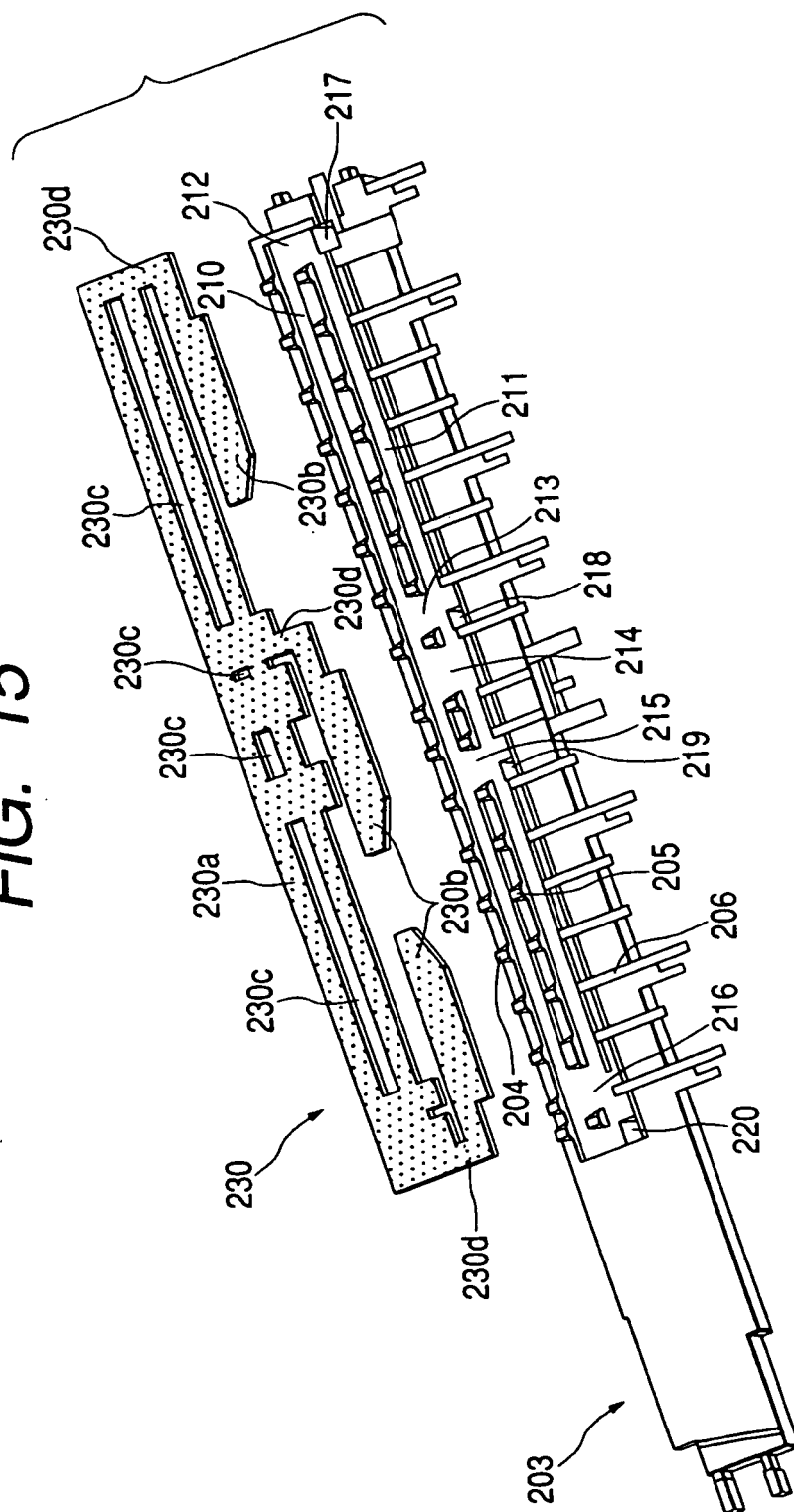


FIG. 16

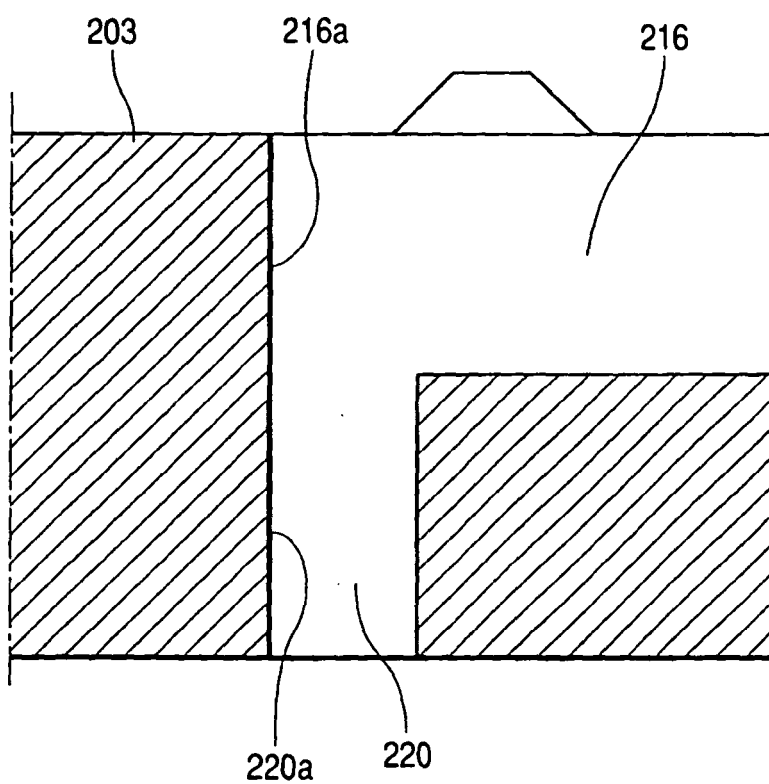


FIG. 17

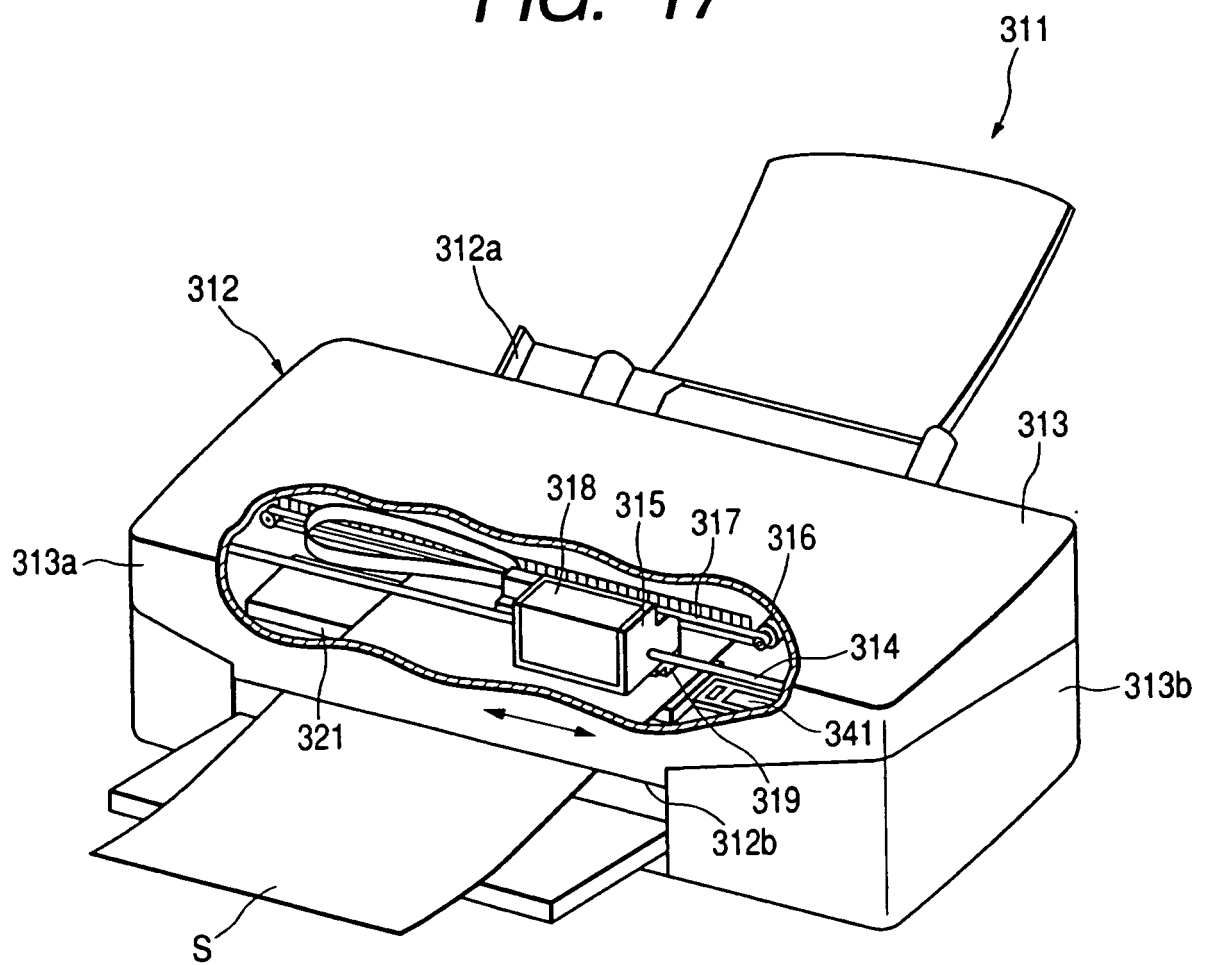


FIG. 18

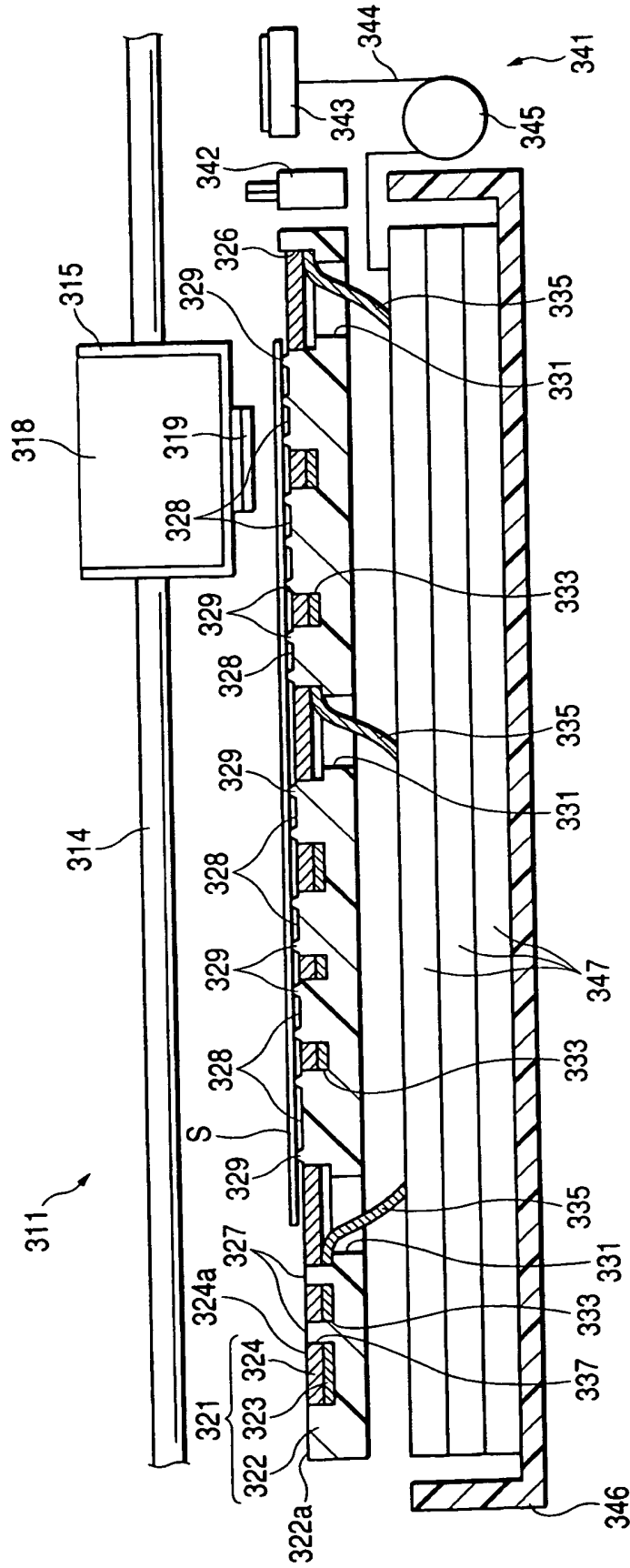


FIG. 19

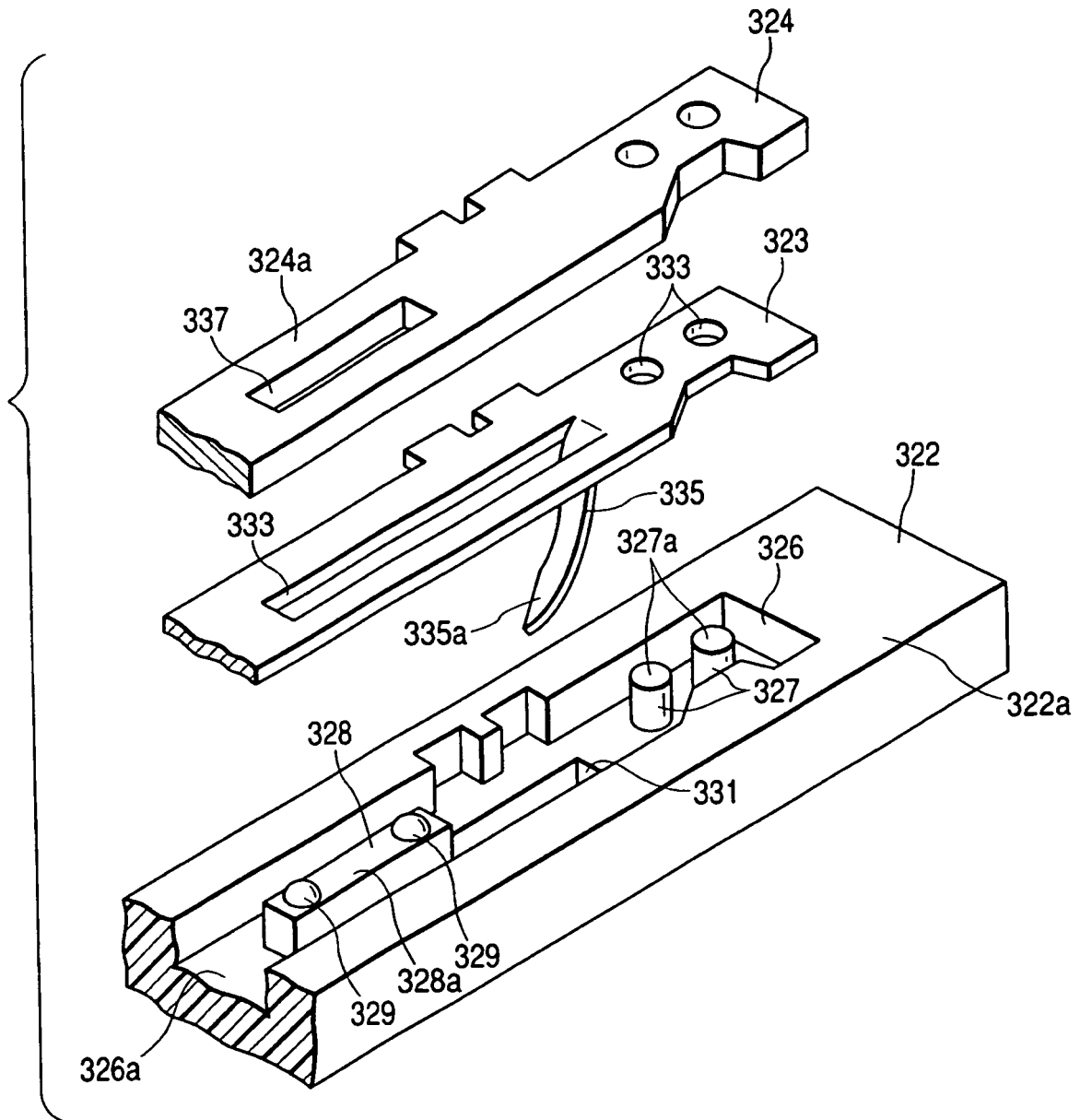
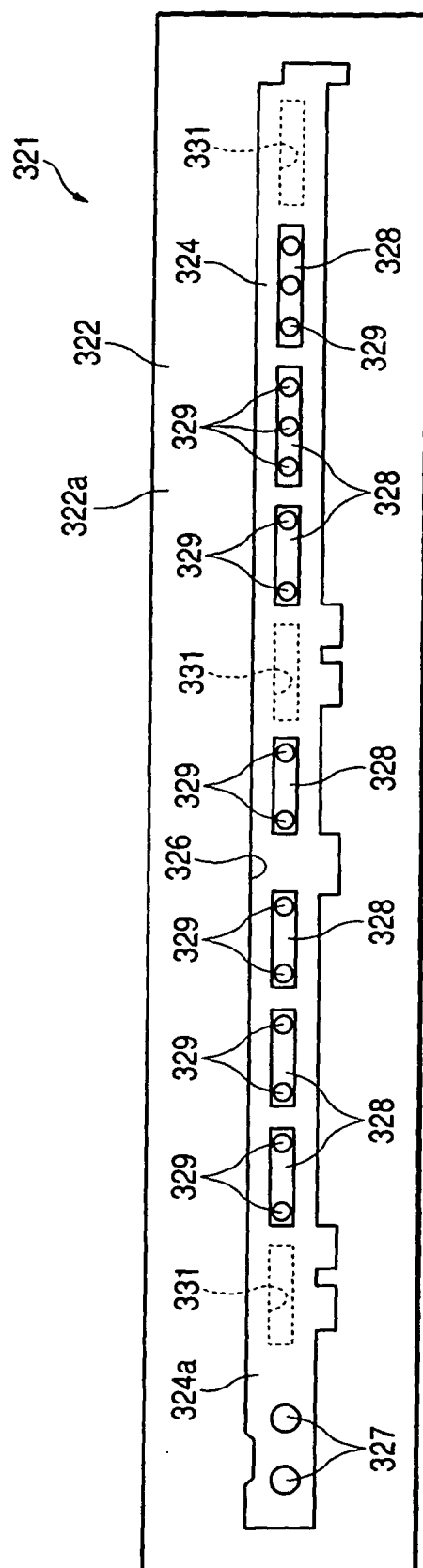


FIG. 20



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2002086821 A [0003]
- JP 2001301201 A [0010]
- EP 1147901 A2 [0012]